NOKIA

DNT2Mi sp/mp

Data Network Terminal Single-port and Multiport Operating Instructions

User Manual

C33975.85--B0

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CE

The following products comply with the protection requirements of the European Union Council Directive 89/336/EEC relating to electromagnetic compatibility (EMC), provided that installed using EMC-compatible installation practices (installation in mechanical housings stated to be EMC-compatible and using cabling material [at least as well shielded] and practices as stated in relevant Nokia user manuals):

Product code	Product versions
T65670/80	DNT2Mi sp/mp, AC-powered
	DNT2Mi sp/mp, DC-powered
	DNT2Mi sp/mp, remote-powered

Contents

Summary of changes

Document	Date	Comment
DN01145897 Issue 1–0 en	19 April 2002	
DN01145897 Issue 2–0 en	27 March 2003	Information on two new D2048 interface units (E62628.10 and E62628.11) added.

1 About this document

These operating instructions introduce the DNT2Mi Data Network Terminal and provide information needed for its installation and use.

The terminal interface units that are used in DNT products are presented separately in document *DTE Interface Units for Nokia Data Network Terminals Operating Instructions*.

2 Introduction to DNT2Mi

Figure 1. Single-port (above) and multiport (below) DNT2Mi terminals

Nokia DNT2Mi is a single- or multiport (sp/mp) data access network terminal intended for customer premises. It provides a two-wire or four-wire SHDSL line interface (ITU-T G.991.2) and up to three interchangeable DTE interface units. The following interface units are available (for more information, refer to Table 2):

- V.11
- V.28
- V.35
- X.21
- G.703/64k
- G.703/2M

- G.704/2M
- EIA-530-A
- Ethernet
- VF
- D2048

Single-port and multiport versions

The single-port version offers one of the DTE interface types mentioned above, whereas the multiport version can house up to three independent DTE interface types. Additionally, the multiport version includes Time Division Multiplexing (TDM), which allows dividing the transmission capacity over each DTE interface according to application needs.

Power supply

DNT2Mi can be fed either with AC 90 to 264 V, DC -20 to -75 V, or remotely via ACL2i through the line.

Management

DNT2Mi can be managed locally with the front panel keys, Nokia’s hand-held Service Terminal, or with a Microsoft Windows-based Macro Service Terminal Emulator (MSTE) program running on a PC. For more information about supported Windows operating systems, refer to the *Macro Service Terminal Emulator User's Manual*.

DNT2Mi can also be managed remotely with Nokia's Network Management System (NMS).

3 Applications

The DNT2Mi Data Network Terminal can be used for Local Area Network (LAN) and Private Automatic Branch Exchange (PABX) connections (see Figure 2). The device can be controlled, configured, and tested either by using the front panel keys and the LCD display or via Nokia's common network management system.

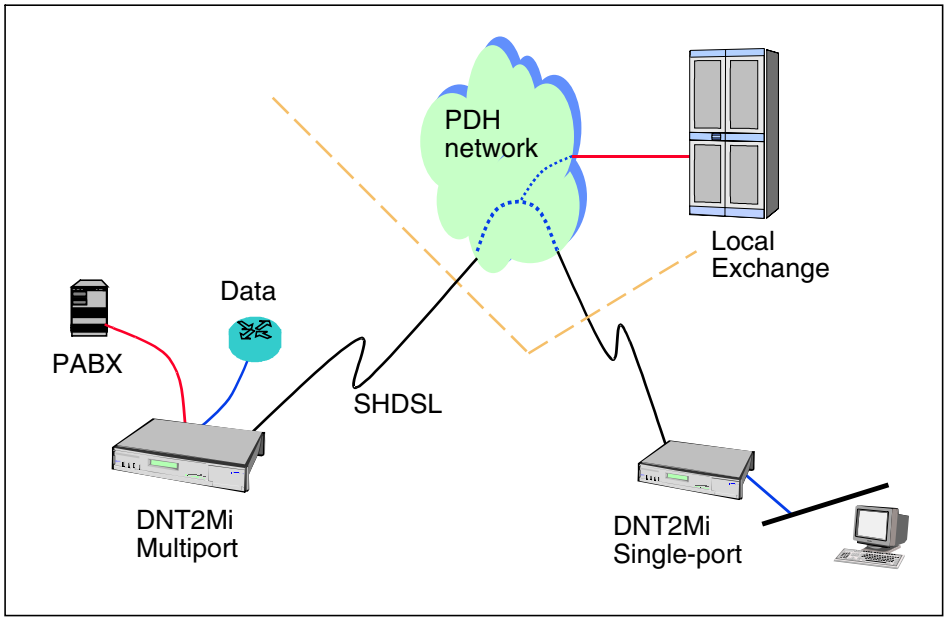


Figure 2. An example of DNT2Mi use

DNT2Mi can also be used in point-to-point connections with a DNT2Mi terminal at both ends of the line (see Figure 3).

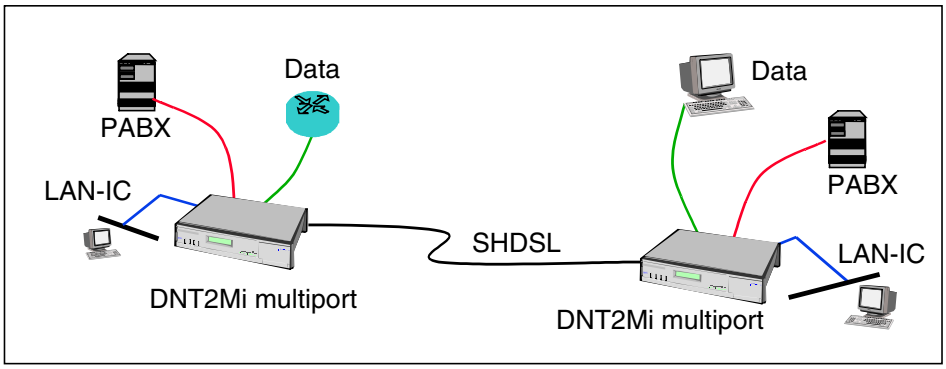


Figure 3. DNT2Mi used in a point-to-point application

DNT2Mi provides an n x 64 kbit/s (n = 1 to 32) data access and enables TDM multiplexing of line rates to three n x 64k ports. It also incorporates V.110 rate adaptation enabling port rates lower than 64 kbit/s.

The line rate is n x 64 kbit/s (n = 3 to 32 in two-wire connection; n = 6 to 32 in four-wire connection but only even numbers can be used), and the Trellis Coded Pulse Amplitude Modulation (TC-PAM) coding is used for transmission.

4 Construction and interfaces

This chapter introduces the mechanical construction and interfaces of DNT2Mi.

4.1 Front panel

The front panel of DNT2Mi includes a display, LED indicators, push-button keys, and a local management connector.

4.1.1 Indicators and keys

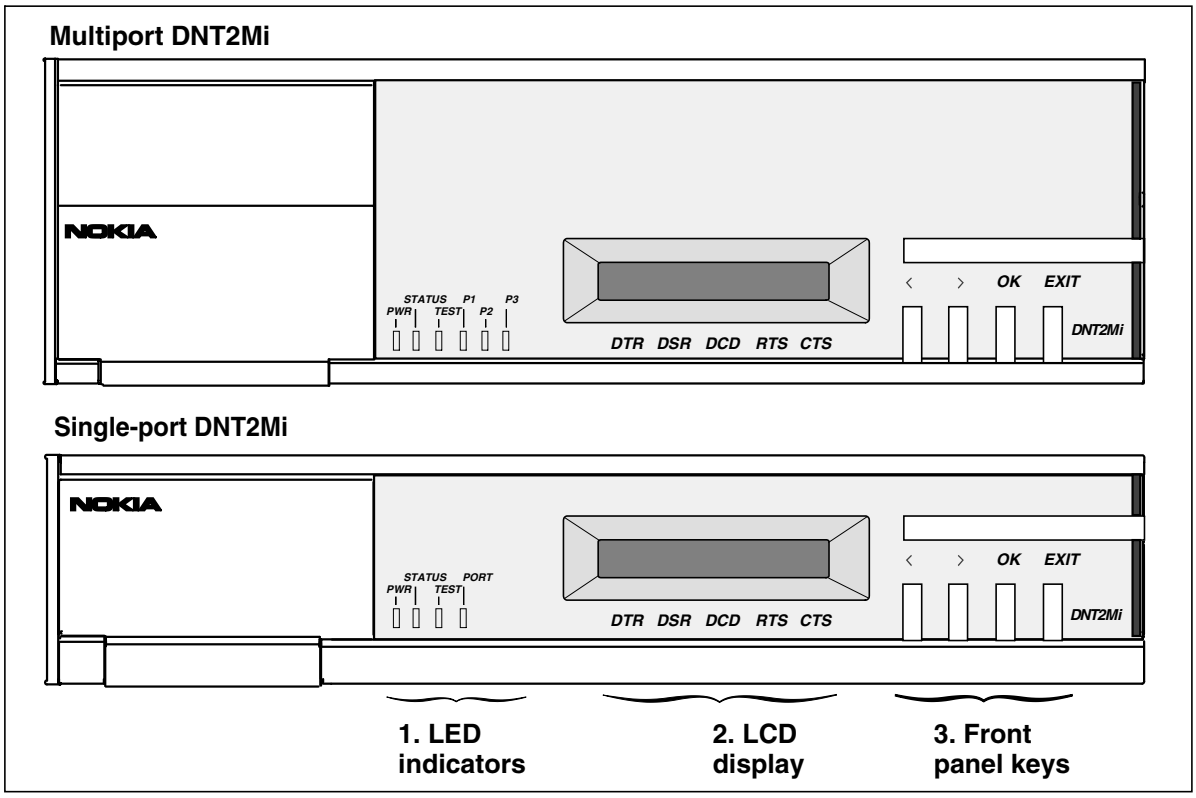


Figure 4. Indicators and keys of the two DNT2Mi units

4.1.2 Local management interface

The local management interface is located behind the front panel door (see Figure 5). The interface is used to manage DNT2Mi with Macro Service Terminal Emulator (MSTE) running on a PC or with other Nokia management software.

If signal 108 (DTR) is on, connecting the Service Terminal Emulator will disconnect DNT2Mi from the remote network management. If signal 108 is off, the entire network can be managed through this equipment.

Management interface cables of DNT2Mi are listed in Table 1.

Electrically, management interface signals comply with ITU-T V.28 or V.11. The selection is made using either front panel menus or Q1 menus.

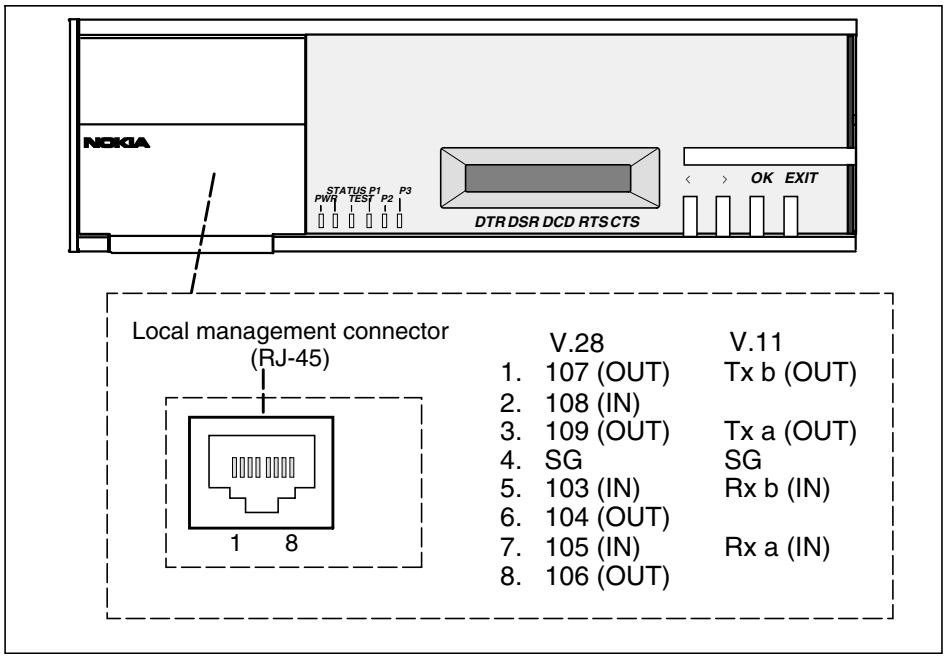


Figure 5. Local management connector

Table 1. Management interface cables

Code	Name	Connector type	Length
TX21750	Management cable (ST -> ACL2i)	Euro c/4 3x7F/D15F	1.5 m
TX25741.06	Management cable (PC -> ACL2i)	D9M/D9F	3 m
E64320.01	Management cable (PC -> DNT2Mi)	RJ45/D9F	3 m

Table 1. Management interface cables (Continued)

Code	Name	Connector type	Length
E62711.01	Management cable (ST -> DNT2Mi)	RJ45/D15F	1.5 m
DZ60639.1	Management cable (PC -> DNT2Mi)	RJ45/D25F	3 m
ST = Service Terminal DNT2Mi = Single-port or multiport n x 64 kbit/s stand-alone Network Terminal PC = PC + Service Terminal Emulator ACL2i = 2 Mbit/s SHDSL Rack-mounted Line Terminal			

Several DNT2Mi units can be connected to the same Q1 bus of V.11-type via a local management interface.

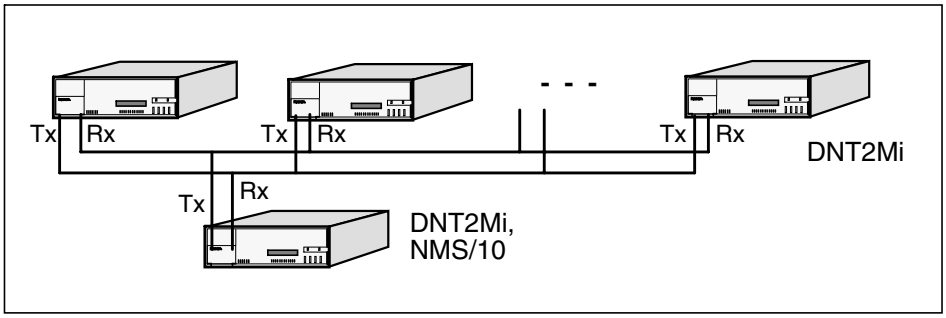
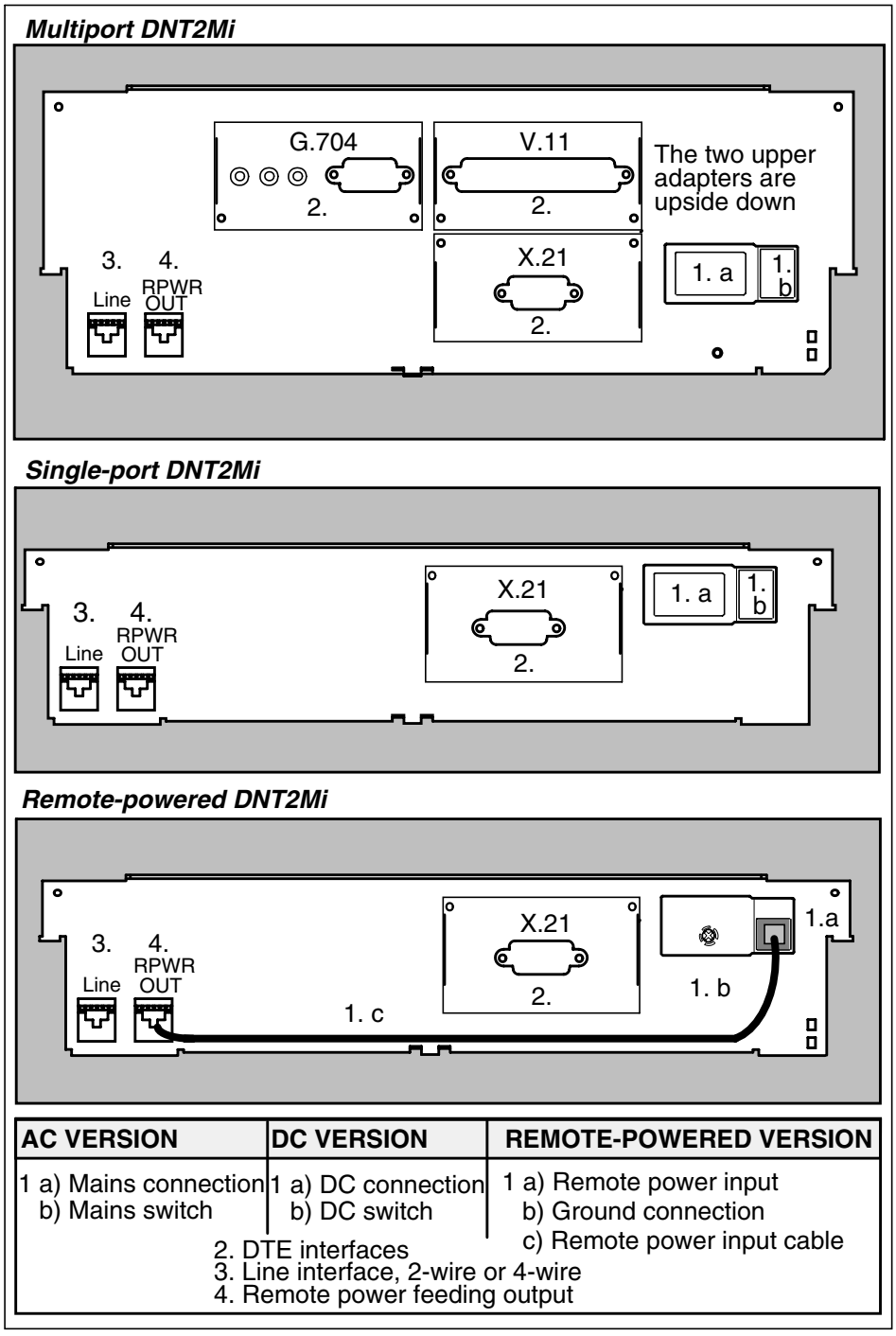


Figure 6. Q1 management bus

4.2 Rear panel



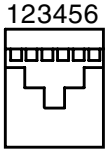
AC VERSION	DC VERSION	REMOTE-POWERED VERSION
1 a) Mains connection b) Mains switch	1 a) DC connection b) DC switch	1 a) Remote power input b) Ground connection c) Remote power input cable

2. DTE interfaces
3. Line interface, 2-wire or 4-wire
4. Remote power feeding output

Figure 7. Rear panels of the DNT2Mi units

6-pin modular jack, RJ-11
Line

123456



Pin	Line interface
1.	Line 1a
2.	Line 1b
3.	Not connected
4.	Not connected
5.	Line 2a (not in use in 2-w mode)
6.	Line 2b (not in use in 2-w mode)

Figure 8. Line interface connector

4.2.1 Terminal interfaces

This section briefly introduces the DTE interface unit options. For more detailed information, refer to document *DTE Interface Units for Nokia Data Network Terminals Operating Instructions*.

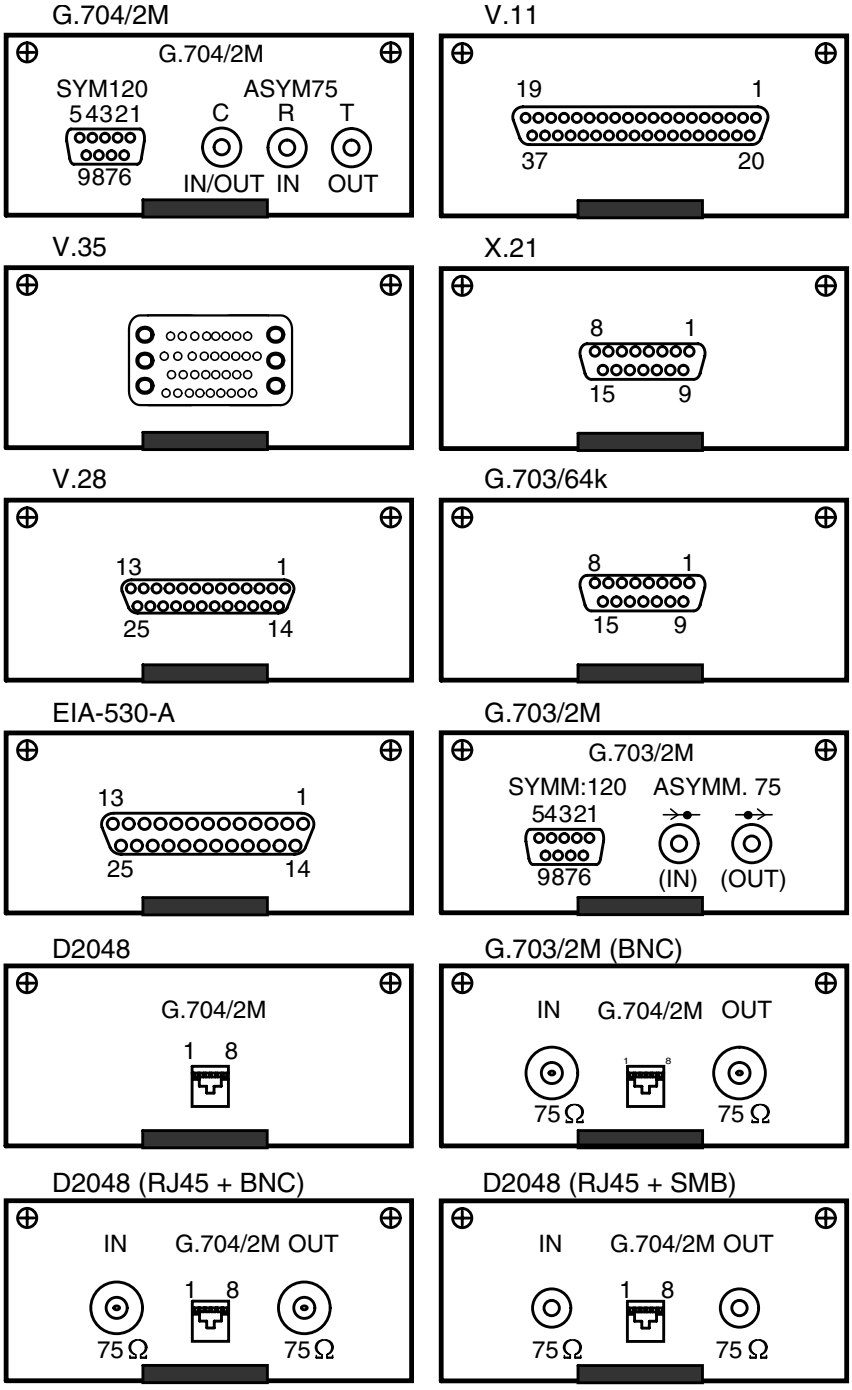


Figure 9. DTE interface options

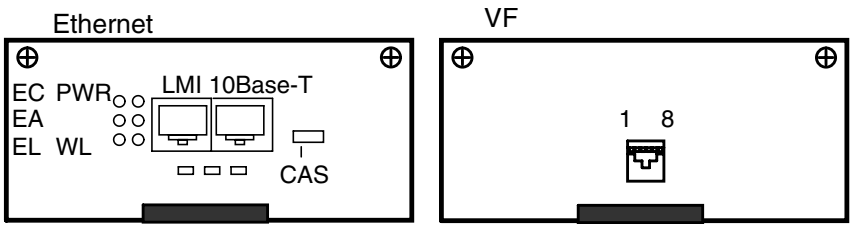


Figure 10. DTE interface options (continued)

The interface type is selected by installing an appropriate interface unit. You can do this without opening the terminal's case. The interface unit types are given in Table 2.

Table 2. DTE interface adapter units

Adapter type	Electrically	Connector type	Product code
V.11	V.11, V.10	D37F	DS 62603.11
V.24	V.28 1)	D25F	DS 62602.11
V.35	V.35, V.28	34F	DS 62604.11
X.21	V.11	D15F	DS 62605.11
G.703/64k	G.703	D15F	DS 62609.11
G.703/2M	G.703	SMBM, BNC or D9F	DS 62607.11
G.704/2M	G.703	SMBM or D9F	DS 62608.11
EIA-530-A	V.11, V.10	D25F	DS 62610.11
ET	10Base-T	RJ45	E66210.02 (Router/Bridge) E66210.22 (Bridge)
D2048	G.703	RJ45	E62628.01
D2048	G.703	RJ45 or BNC	E62628.10
D2048	G.703	RJ45 or SMB	E62628.11
VF	Analogue 2/4-wire	RJ45	E62612.02

1) In accordance with the ITU-T Recommendation V.28, this type of electrical interface can be used up to 19.2 kbit/s. With proper cabling, however, operation up to 64 kbit/s is possible.

5 Installing DNT2Mi

This chapter provides instructions on how to mechanically install and connect DNT2Mi. The menu settings required for bringing the unit into use can be found in Chapter 6.

5.1 Electromagnetic compatibility

DNT2Mi complies with EMC specifications (refer to Chapter 10) when the following conditions are fulfilled:

- The securing screws of the multiport DNT2Mi cover are properly fastened.
- All multiport DNT2Mi ports are provided with adapters, or unused ports provided with dummy plates.
- The DTE cables and connectors are provided with reliable shielding.
- The connector's connecting screws are properly fastened, so that shielding integrity from the metal housing of the equipment to the cable shield over the interconnecting interface is secured.
- A grounded 3-conductor mains cord and a grounded mains outlet for mains-powered DNT2Mi terminals, or a similar grounding for DC-powered versions, is used.

5.2 Grounding of DNT2Mi

The AC-powered version of DNT2Mi is grounded properly when the mains cord is connected to a grounded mains outlet.

The DC-powered version of DNT2Mi has a separate pin reserved for the ground connection, refer to Section 5.8.

5.3 Clearances around DNT2Mi

When installing DNT2Mi on a wall or freely on a horizontal level, you must ensure that there is an adequate space for connecting cables. Recommended clearances are shown in Figure 11.

In a modem-shelf installation, slot sizing of the shelf ensures adequate horizontal clearances between the units.

Heat released from the unit is insignificant, and does not therefore set requirements on the clearances around the equipment. DNT2Mi is cooled through natural convection through air inlets and outlets located in the bottom and top of it.

Caution

Do not cover DNT2Mi. The air inlets and outlets must be unobstructed to maintain proper circulation of air.

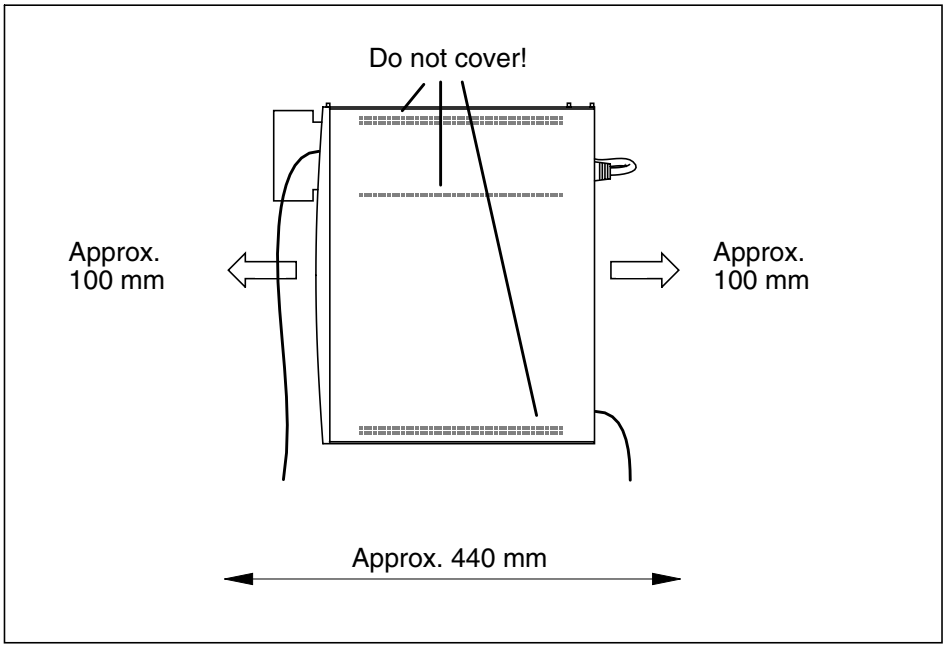


Figure 11. Clearances around DNT2Mi

5.4 Work order

First examine the unit and make sure that it has not been damaged during transportation. Also, check that you have the cables needed for connections (mains cable, DTE cable, line cable).

Then proceed according to the steps below:

1. Insert DTE interface units into the DNT2Mi terminal, if needed, refer to Section 5.5.
2. Insert DNT2Mi in a special shelf-like modem subrack or on a wall, if needed, refer to Section 5.7. Otherwise, proceed with the free-standing installation described in Section 5.6.
3. Plug the mains cord into a grounded mains outlet (AC version) or connect the DC power lines (refer to Section 5.8).
4. Connect DNT2Mi to your DTE and to the line.
5. Switch on the power (AC or DC). The modem performs a self test.
6. Adjust the LCD contrast, if needed, refer to Section 5.9.2.

   Then proceed to check that the main settings are correct (the settings are described in Chapter 6). The settings can be checked and altered using either the front panel keys and display (Chapter 8) or by using the Q1 connection (Chapter 9).

5.5 Inserting DTE interface units

Caution

The equipment is sensitive to static electricity. When handling the units you should follow the general instructions concerning handling of ESD-sensitive equipment. You should always take antistatic precautions (such as a wrist grounding) when handling a plug-in unit once it has been removed from its antistatic packaging.

If the DTE interface units are not pre-inserted or a unit needs to be changed, follow the instructions below.

To insert DTE interface units:

1. Make sure that the power is switched off.

Caution

The multiport version of DNT2Mi has three slots and the DTE interface units that go to the upper slots (2 and 3) need to be inserted upside down.

2. Insert a DTE interface unit carefully into the slot.

3. Tighten the two screws.

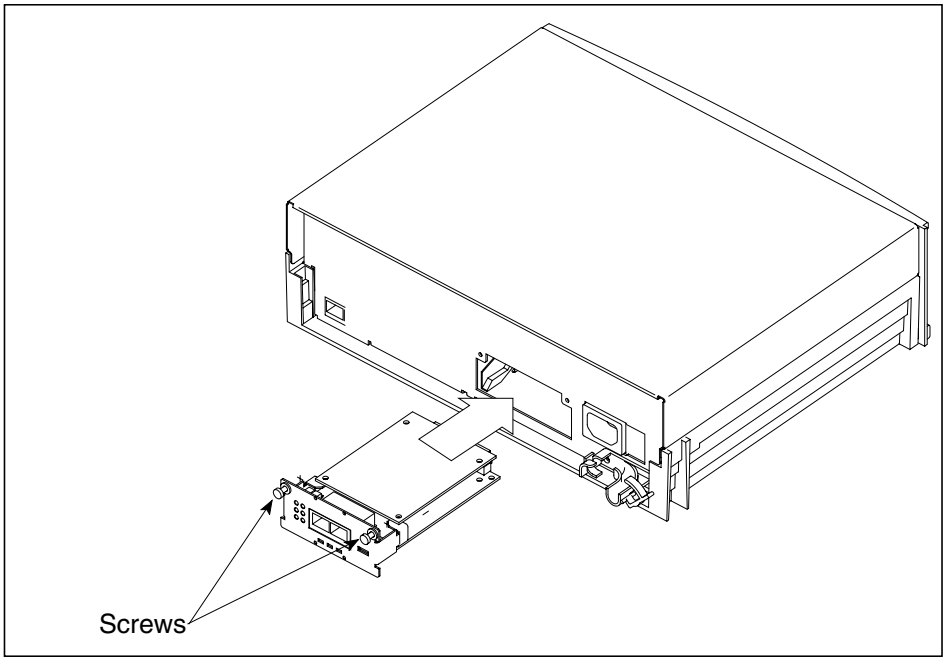


Figure 12. Inserting DTE interface units into DNT2Mi (single-port)

5.6 Free-standing installation

Note

A free-standing installation of DNT2Mi is allowed only if permitted by the local electric safety regulations!

To install DNT2Mi free-standing:

1. Place DNT2Mi on a dry and clean horizontal level.

Caution

Make sure that the unit may not be dropped incidentally!

2. Guide the strain relief as advised in Figure 24.
3. Take care of the grounding as advised in Section 5.2.

5.7 Installing DNT2Mi on a wall or into a rack

This section gives instructions for the mechanical installation of DNT2Mi into a 19-inch rack or on a wall.

The mounting accessories used are:

- DS 62000.1 Modem shelf for low housing (single-port, 7 units)
- DF 62001.1 Wall-mounting bracket
- DF 62010.1 DC-power rail.

5.7.1 Installing DNT2Mi on a wall

Note

When selecting an installation location, make sure that all cables can be easily connected. See Figure 11 for adequate clearances.

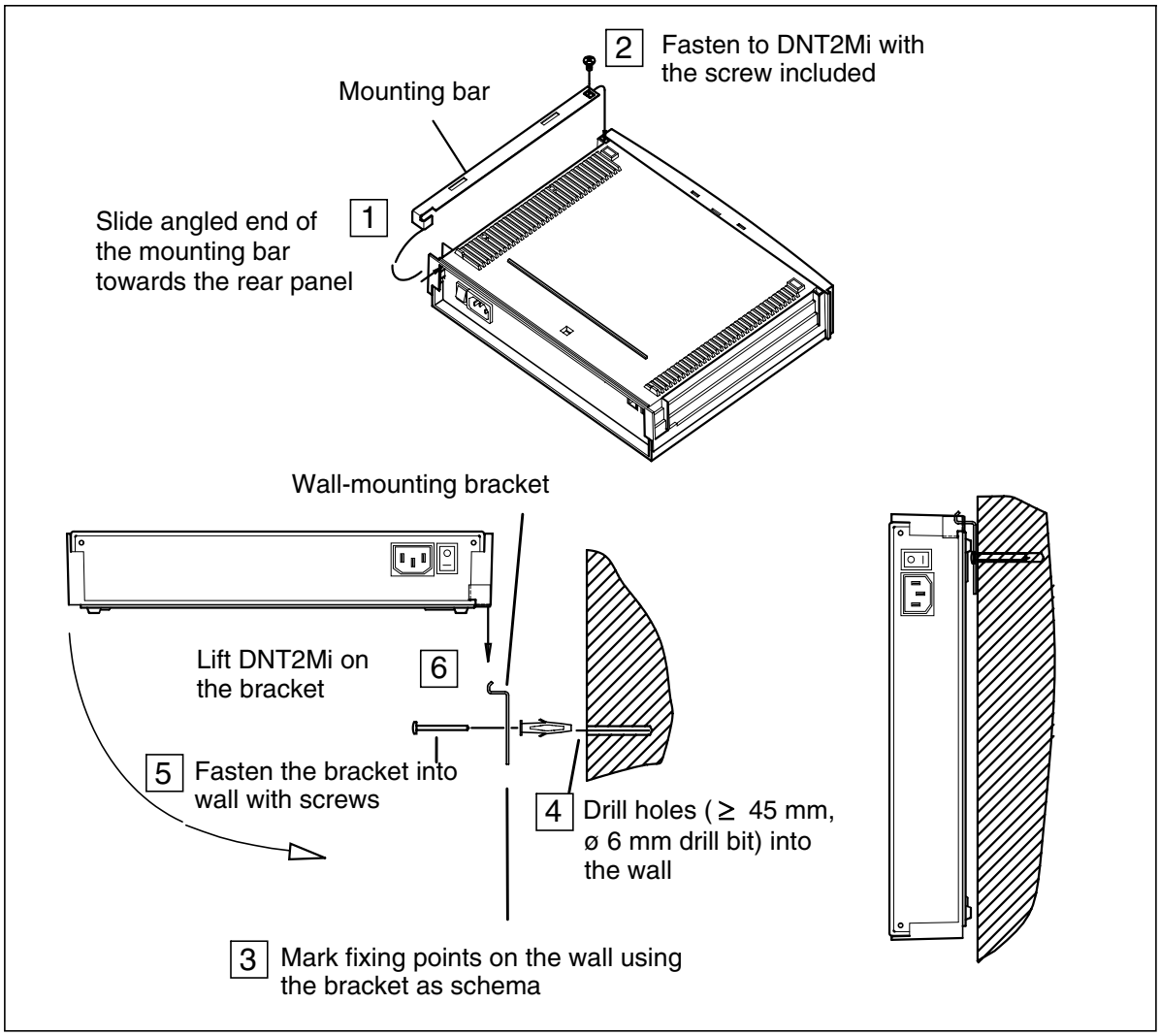


Figure 13. Installation of DNT2Mi on a wall

To install DNT2Mi on a wall:

1. Position the mounting bar onto DNT2Mi.
   - Place DNT2Mi bottom-side up and slide the angled end of the mounting bar towards the rear panel.
   - Ensure that the pin in the other end of the mounting bar locks into the opening in the bottom of DNT2Mi.

2. Fasten the mounting bar into the opening in the bottom of DNT2Mi with the screw included. Use a Phillips screwdriver.

3. Mark fixing points on the wall for two screws using the wall-mounting bracket as schema (Figure 14).

   - Position the bracket on the wall in horizontal position, its hooks facing upwards. Use a spirit level to check that the bracket is in a straight position.

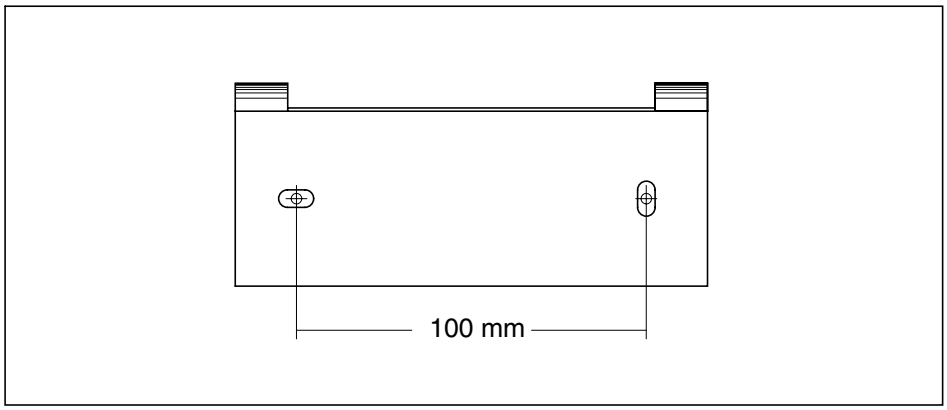


Figure 14. Marking of fixing points for wall screws

4. Drill holes (≥ 45 mm) into the wall (Figure 15). Use a drilling machine with a ø 6 mm drill bit.

   • Clean the holes and insert the included anchor plugs into the drilling holes, if the wall material requires them.

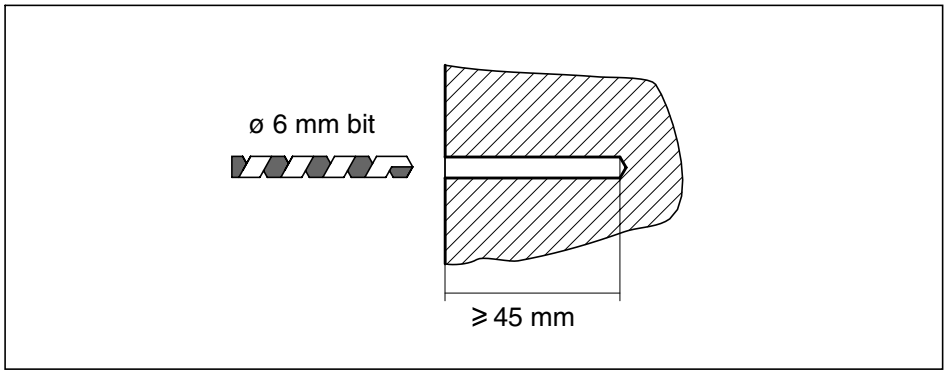


Figure 15. Drilling screw holes into a wall

5. Fasten the wall-mounting bracket on the wall.

   - Position the bracket on the wall and fasten it by screwing the included wall screws into the drilling holes.

6. Lift DNT2Mi on the wall.

   - Slide the fixing holes of the mounting bar into the hooks of the wall-mounting bracket and lay the lower end of DNT2Mi down against the wall.

5.7.2 Uninstalling a wall-mounted DNT2Mi

To uninstall a wall-mounted DNT2Mi:

1. Switch off the power.
2. Disconnect the cabling.
3. Lift DNT2Mi from the hooks of the wall-mounting bracket.

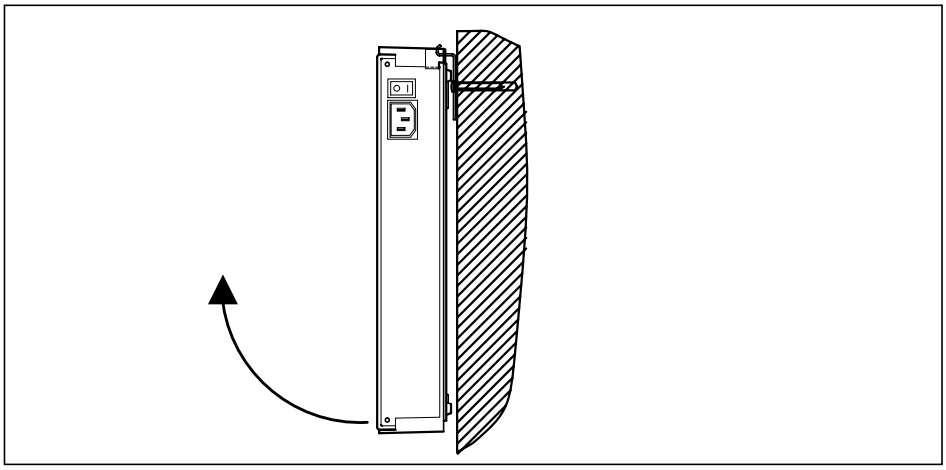


Figure 16. Uninstalling DNT2Mi from the wall

5.7.3 Installing a modem shelf into a 19-inch rack

Before installing DNT2Mi into a modem shelf, install the modem shelf into a 19-inch rack or cabinet.

To install a modem shelf into a 19-inch rack:

1. Insert the modem shelf into the 19-inch rack.
   - Align the fixing holes of the modem shelf with the fixing holes in the rack.
2. Put the rack mounting nuts (8 pcs) to the rack and fix the modem shelf to the rack with eight screws.
3. Tighten the screws with a 5 mm Allen key.

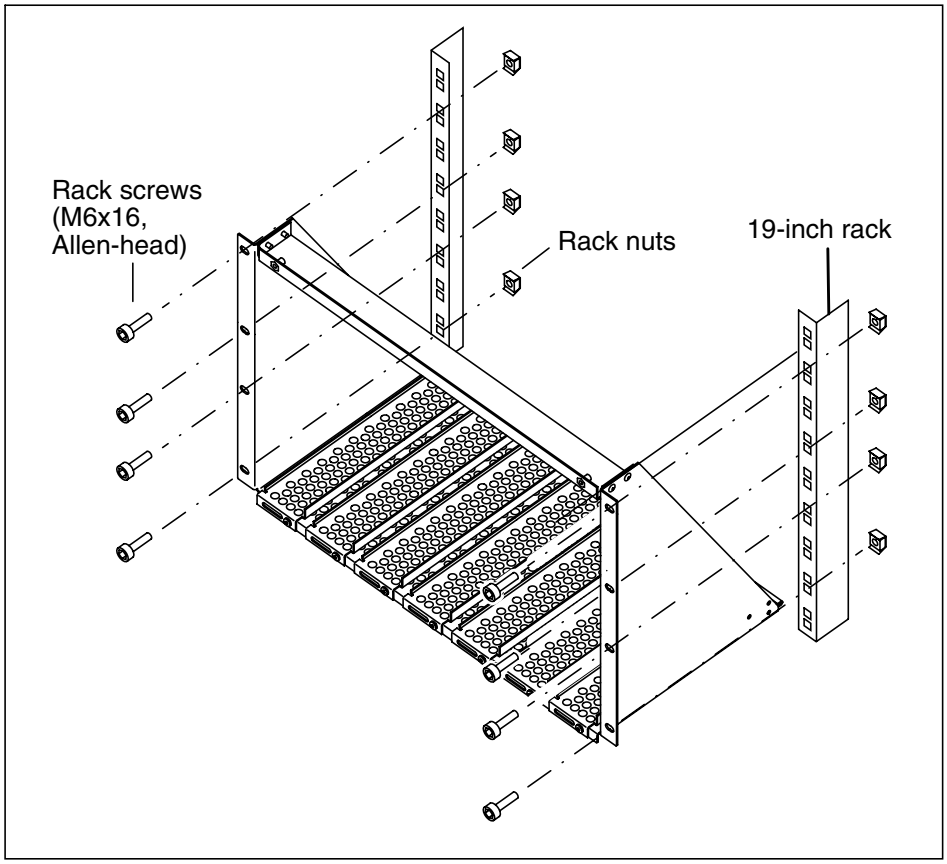


Figure 17. Installing a modem shelf into a 19-inch rack

5.7.4 Installing DNT2Mi in a modem shelf

After you have installed the modem shelf into a 19-inch rack or cabinet, continue by installing DNT2Mi in the modem shelf.

To install DNT2Mi in a modem shelf:

1. Insert DNT2Mi into a free slot in the shelf.
   - Push until the unit locks into the stopper at the end of the slot rail.
2. Fasten the locking bar with the thumb screws included to lock DNT2Mi into the shelf.
   - Position the locking bar its openings facing upwards and flat side against the upper edge of the shelf.
   - Position the thumb screws through the locking bar's openings into the fastening holes of the shelf and tighten the screws. Alternatively, you can first tighten the screws loosely, then slide the locking bar into its place and tighten the screws firmly.

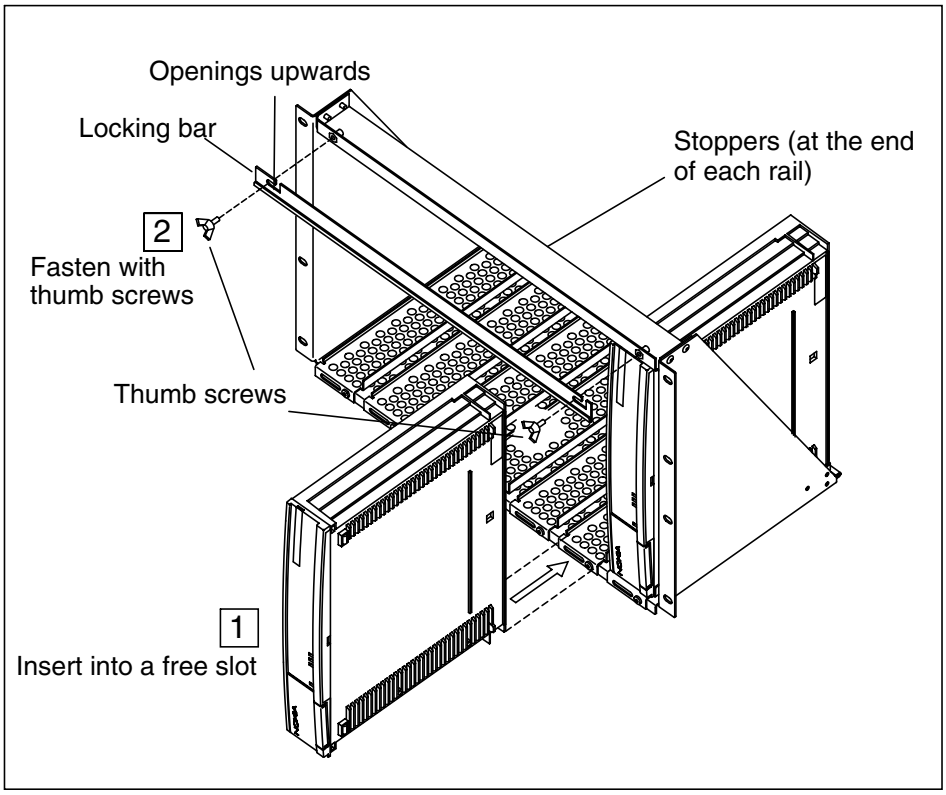


Figure 18. Installation of DNT2Mi in a modem shelf

5.7.5 Uninstalling DNT2Mi from a modem shelf

To uninstall DNT2Mi from a modem shelf:

1. Switch off the power.
2. Disconnect the cabling.
3. Loosen the thumb screws of the locking bar. Do not remove the screws completely.
4. Remove the locking bar by pushing it to left and stringing it out through the slots.
5. Draw DNT2Mi out of the modem shelf.

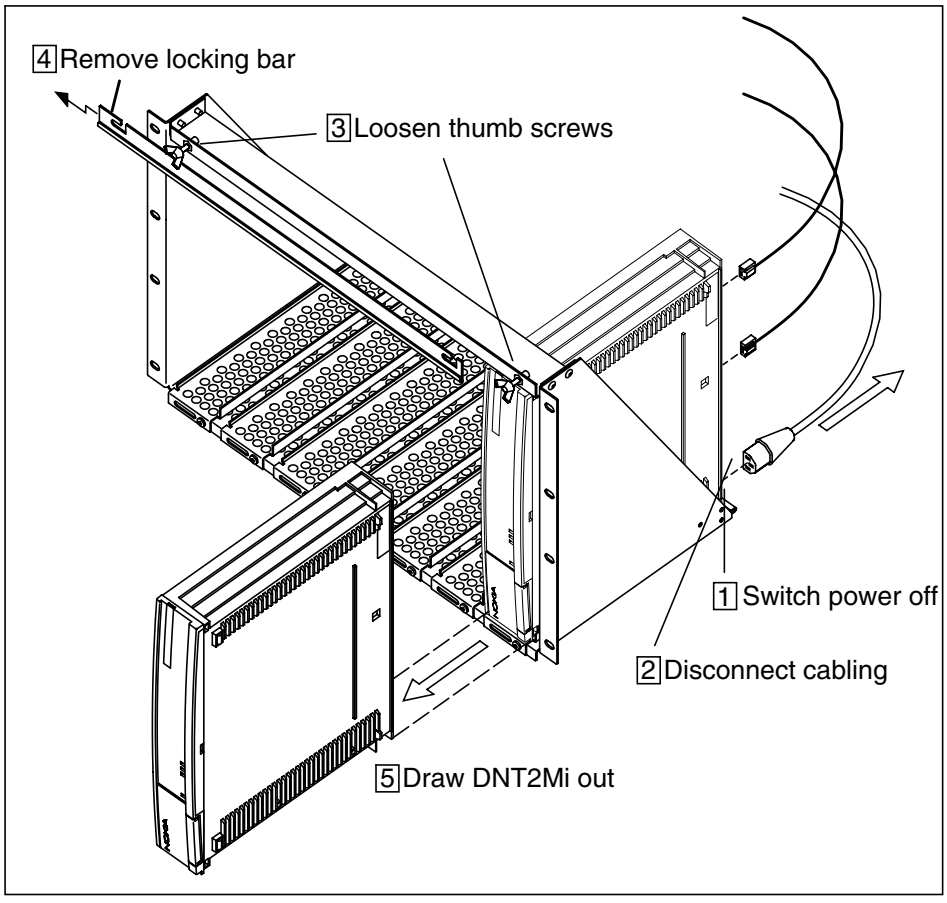


Figure 19. Uninstalling DNT2Mi from a modem shelf

5.8 Connecting power supply

This section specifies the requirements for the mains power supply of the site.

WARNING

MAINS VOLTAGE!

Follow the national legislation when working with the power supply. DNT2Mi must be permanently wired to a disconnect device (for example circuit breaker) in accordance with the current local and national wiring standards.

The following warning applies to the AC power supply:

The protective ground wire can only be used for protective conductor installations. Using the protective ground conductor for other purpose is dangerous to life. Ensure that the ground connection is established before the power outlet is connected to the power interface.

The power supply of DNT2Mi can operate at the following voltages:

- 90 to 264 V_{AC} (AC-powered unit)
- -20 to -75 V_{DC} (DC-powered unit)
- 50 to 150 V (remote-powered via ACL2i).

Power interfaces are located on the rear panel of DNT2Mi.

AC mains is recommended to be protected with a lightning and transient overvoltage protector (mains wire-in protector). This protection is not included in DNT2Mi.

Note

In general, mains fuses and supply cables have to be rated according to the national electric safety regulations.

DNT2Mi can be connected either to a positive-grounded or to a negative-grounded DC power system. Principles of the DC power systems are presented in Figures 20 and 21.

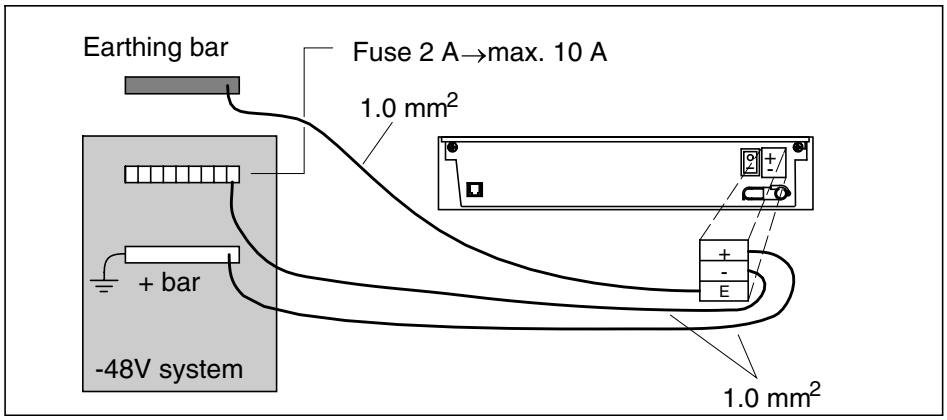


Figure 20. Principle of a negative-grounded DC power system

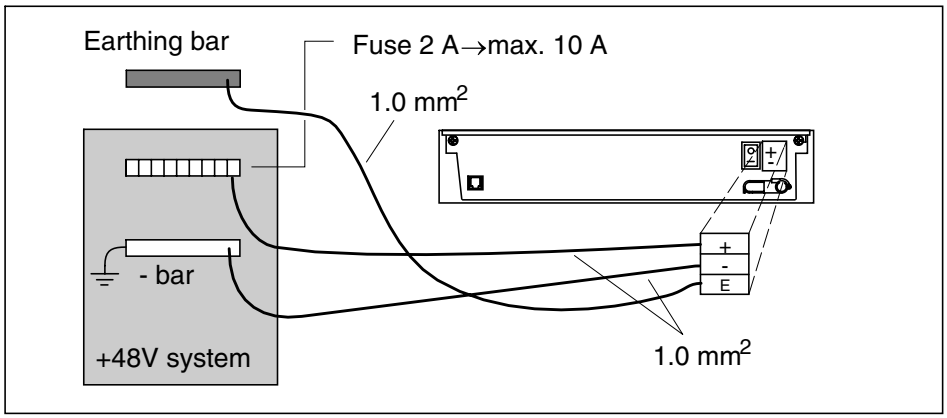


Figure 21. Principle of a positive-grounded DC power system

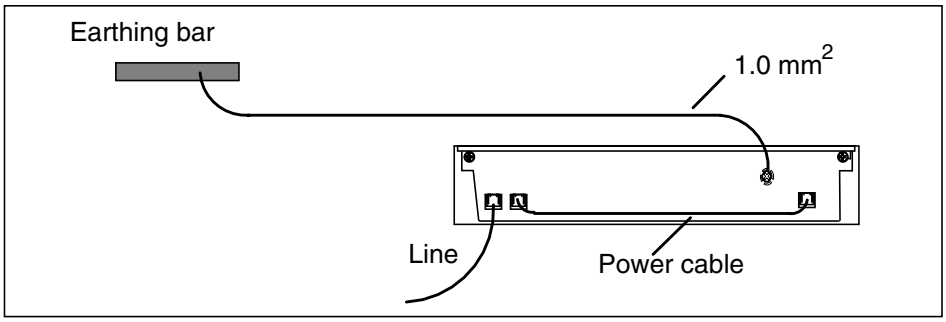


Figure 22. Grounding principle of the remote-powered system

Note

If the remote power feed is connected in a wrong way, that is, if the pairs are cross-connected at the DNT end, the receiving remote unit still functions properly. However, in this situation data transfer is not possible. See Figure 23.

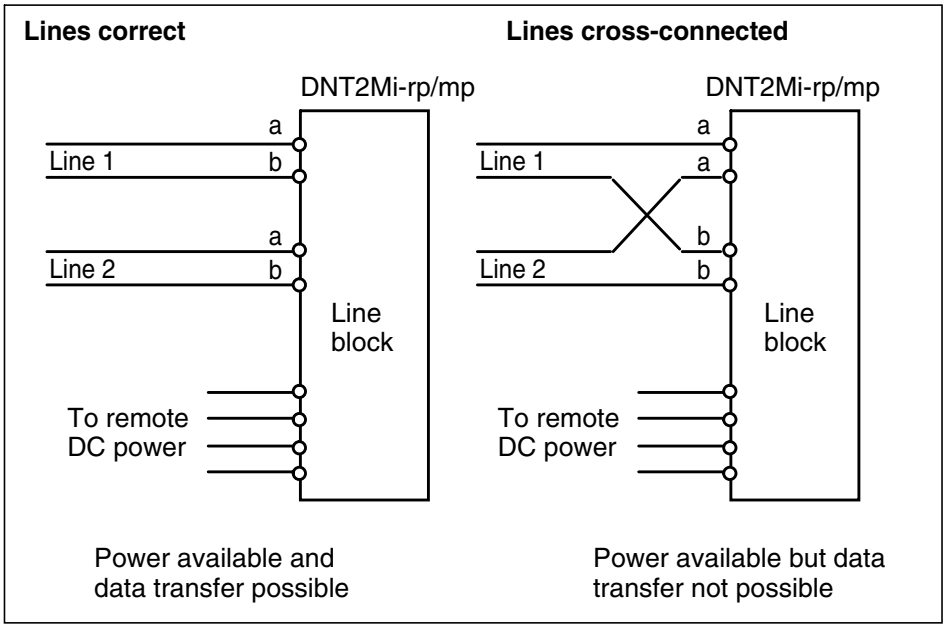


Figure 23. Remote power feed connection

5.8.1 Troubleshooting

Remote-powered DNT2Mi

If there is a backlight but no menu on the display of DNT2Mi, the line is too long, or there is a line break on one of the pairs.

If the initial displays are shown, but the unit resets after a while, the situation may be due to the fact that the line is too long.

If there is no backlight to be seen, the line is too long, or the power supply is broken.

The status LED is red

Check the Status field of the top level menu display and check the **Status** and **Alarm** submenus under the **Monitoring** menu.

Location of error source

Test the connection according to information in Section 7.3.

Note

The network terminal must be connected to a ground mains outlet.

5.8.2 Strain relief

In an AC-powered unit, guide the power cable through the strain relief located under the power interface to secure a firm connection (see Figure 24).

In a DC-powered unit, the DC-power cable is connected and guided through the strain relief at the factory.

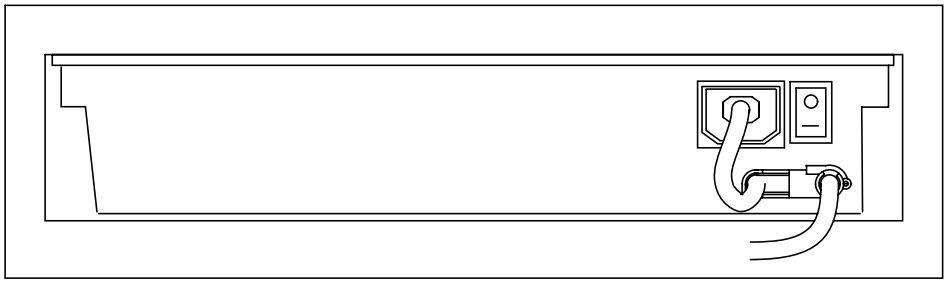


Figure 24. Strain relief

5.9 Completing the installation

5.9.1 Verifying the installation

To verify that you have installed DNT2Mi correctly:

1. Switch the power to DNT2Mi with the power switch on the rear panel.
2. Check that the green LED (PWR) lights up on the front panel.

Caution

Do not cover DNT2Mi. The air inlets and outlets must be unobstructed to maintain proper circulation of air.

5.9.2 Adjusting the LCD display

The LCD adjustment (see Figure 25) may be necessary if the viewing angle differs from the normal table-top viewing angle, which is the case, for example in a wall mounting. Adjust the contrast with a small crosshead screwdriver.

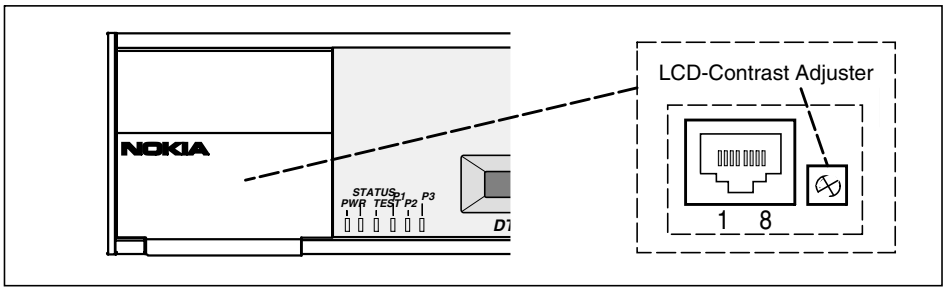


Figure 25. Adjusting LCD contrast

5.9.3 Recommended actions after the installation

After the installation, we recommend you to:

- Label DNT2Mi unit(s) and cables according to your installation plan to help future maintenance operations.
- Clean the site after installation. Recycle any applicable material.

6 Commissioning DNT2Mi

This chapter describes the most common items that need to be checked before DNT2Mi is taken into use.

DNT2Mi is ready to operate after the power supply (AC, DC, or remote power) and port and line cables are connected. However, identifications and settings should be checked and, if required, statistics and error counter should be reset.

DNT2Mi can be configured, tested, and controlled via:

- Front panel LCD and keys
- Service Terminal (using Q1)
- Macro Service Terminal Emulator running on a PC (using Q1).

Other Nokia management products, such as Nokia NMS, can be used for the same purpose.

Menu structure for the front panel menus is shown in Chapter 8. Menu structure for Q1 management is shown in Chapter 9.

The tables in Appendix A can be used to mark down information gathered during the commissioning procedure.

Note

It can take up to 60 seconds to save the altered settings. If the power is switched off during this time, the new settings will be lost. During the saving process, you can use the equipment normally.

6.1 Automatic power-up test

When the power is switched on, the unit performs an automatic self test, which is used to check the most vital operational functions of the equipment.

During the power-up test, the Status LED and the Test LED are lit.

After the automatic power-up test, the display indicates possible errors found during the test. More detailed information on the fault can then be found in the **Self test** menu.

The test ends automatically if no fatal errors were found.

6.2 Management

DNT2Mi can be managed through the line connection, local management, or port connection.

The following items need to be checked:

Q1 transmission speed (Q1: 6,1,1)

The Q1 transmission speed needs to be set to match the system management speed.

Q1 address information (Q1: 6,1,2)

The equipment needs a Q1 address to be visible in the NMS systems. You must give a unique address to each equipment.

You can also enter a name for the equipment by using the command **4,7,2,1**.

Q1 management path (Q1: 6,1,3)

The routing of the management must be defined to correspond with the system.

Note

The address setting has the following restrictions:

- The address 4095 must not be given if the equipment is connected to an NMS bus. This address is a common (broadcast) address.
- The address 4094 is reserved for PC-TMC/STE use (general address for the PC interface unit).
- The address 0 is reserved for PC-TMC/STE use (default address for the PC interface unit).

6.3 Timing source

Before connecting DNT2Mi to a network, you need to know how the network is timed.

DNT2Mi can receive timing information through the line and port interfaces. DNT2Mi can also be used as a network timing source using the unit's internal timing circuits.

More information can be found in Sections 9.3.3 and 9.3.5.

6.4 Line settings

You have to check the following items:

Line interface (Q1: 6,3,3)

The line interface settings determine line SHDSL mode, connection speed, and use of wires.

Typically, DNT2Mi is configured as STU-R, Rate Adaptive. The Rate Adaptive mode automatically adapts the requested fixed line rate to STU-C.

Power backoff (Q1: 6,3,6)

Select this option to enable or disable transmit power reduction on short loops.

Line alarms (Q1: 6,3,8 and 6,3,9)

The BER alarm limit and alarm severity have to be checked.

6.5 Port settings

Adapter unit types are automatically recognised by DNT2Mi and can be seen from the **Identifications** menu, for instance.

Port settings (Q1: 6,4, port#,3)

Different adapters include different configurable parameters. Check that port settings are compatible with the equipment they are connected to.

Note

There are some adapter settings that are done by changing the jumper settings on the actual adapter. For more information, refer to document *DTE Interface Units for Nokia Data Network Terminals Operating Instructions*.

Port alarms (Q1: 6,4, port#,5)

Check that the Q1 alarm visibility is set correctly, that is, enabled or disabled. If Q1 alarms are disabled, port alarms are not visible in the NMS system.

Also, the BER alarm limit and the alarm severity need to be checked.

6.6 Time slot settings (Q1: 6,5)

DNT2Mi can map a certain amount of time slots from the line connection directly to a port. Check and configure the time slot allocations, if necessary.

Note

Pay close attention to the mapping of time slot 0. For example, time slot 0 cannot be mapped with G.704 adapters.

6.7 Protection settings

Password (Q1: 10,1 and 10,4)

DNT2Mi settings can be protected with a password.

Front panel key rights (Q1: 10,5)

The front panel keys can be used to configure the equipment and to launch tests (**Test activation**). Both functions can be either enabled or disabled.

6.8 Measurements

After all the settings have been checked, we recommend that you carry out a line quality and a BER test.

Note

Before starting the BER test, reset all statistics and error counters. Read statistics and error counters after the BER test.

Noise margins, Rx and Tx line levels, and attenuations (Q1: 7,1...3)

Establish a link between two units. After the line is up, check the noise margin, Rx level, and line attenuation from the **Measurements** menu.

You can use Table 28 in Appendix A to mark down the results for line attenuation.

Bit error rate test

We recommend you to perform a five-minute bit error rate (BER) test. For the test, you need an external test equipment.

You can use Table 27 in Appendix A to mark down the results.

After the tests

Check that all alarms have disappeared and the statistics are still correct.

Table 3. Monitoring a line

Tx level Line 1 or 2: xx dBm	xx = +7.5 to +14.5 dBm
Rx level Line 1 or 2: xx dBm	xx = +14.5 to -26 dBm
Noise margin Line 1 or 2: xx dB	xx = 0 to +15 dB
Attenuation Line 1 or 2: xx dB	xx = 0 to 41 dB

Table 3. Monitoring a line (Continued)

Line voltage: xx V	Alternatives: 55 to 155 V + no remote power
Signal quality Last 15 min	Signal quality monitored during 1 period of 15 minutes to max. 4 (with front panel menus) or 100 (with Q1 menus) successive periods of 15 minutes. Front panel menus give you absolute values and Q1 menus both absolute and relative values.
Signal quality Last 24 hours	Signal quality monitored during 1 period of 24 hours to max. 4 (with front panel menus) or 30 (with Q1 menus) successive periods of 24 hours. Front panel menus give you absolute values and Q1 menus both absolute and relative values.

Table 4. Explanation of noise margin

Noise margin	**Bit error ratio**
+15 dB +1 dB	Expected BER < 10^{-7}
0 dB	Expected BER 10^{-7}

6.9 Default values

The following default values can be recalled, for example from the Q1 menu path **6,6**:

Table 5. Global parameters

Timing source	Line
Front panel operation rights	Testing and configuration allowed
Q1 address *)	2
Q1 management path	Q1 via line: on LM interface: on
Control and test loop limit	10 minutes
Q1 password for settings	No protection, password: DNT2Mi
Equipment ID	DNT2Mi
Use of front panel	Full menu

Table 5. Global parameters (Continued)

Use of front panel keys	In use
Q1 rate *)	4800 bit/s
*) = Recalling the default values does not change the values set for the Q1 management parameters. The original values for these parameters can be recalled by recalling the factory settings, refer to Section 6.10.	

Table 6. Line parameters

Line interface	STU-R rate adaptive, 2-wire
Power backoff	ON
Bit error alarm limit	10^{-6}

Table 7. Multiplexer parameters

Use of time slots	No time slots connected

Table 8. Port parameters, V-series (V.11, V.28, V.35 or EIA-530-A)

Port rate	n x 64k (n=1)
Use of V.110 rate adaptation in port 2 or 3	Not in use
In port 2 or 3	9600 kbit/s, Synchronous
Remote loop detection	Allowed
Externally caused alarms	Disabled (not to be seen through Q1). However, even if these alarms are disabled, they cause front panel alarms.
Rx timing (CT103)	DCE source (CT114)
CTS use	Not in use
CTS	On
DCD	Follows line synchronisation
DSR	On
Circuit 140	Disabled
Circuit 141	Disabled

Table 9. Port parameters, X.21

Port rate	n x 64k (n=1)
Use of V.110 rate adaptation in port 2 or 3	Not in use
In port 2 or 3	9600 kbit/s, Synchronous
Remote loop detection	Allowed
Externally caused alarms	Disabled (not to be seen through Q1). However, even if these alarms are disabled, they cause front panel alarms.
Circuit C	Ignored
Circuit I	Follows line synchronisation
Use of RL request from DTE	Disabled
Use of LL request from DTE	Disabled

Table 10. Port parameters, G.703/64k

Port rate	n x 64k (n=1)
Remote loop detection	Allowed
Externally caused alarms	Disabled (not to be seen through Q1). However, even if these alarms are disabled, they cause front panel alarms.
Port rate	64k (always)
Interface mode	Codirectional
AIS mode	No octet timing

Table 11. Port parameters, G.704/2M

Port rate	n x 64k (n=1)
Remote loop detection	Allowed
Externally caused alarms	Disabled (not to be seen through Q1). However, even if these alarms are disabled, they cause front panel alarms.
Framing format	Basic frame

Table 11. Port parameters, G.704/2M (Continued)

G.704 TS map	Equal to line
Unused time slots	Filled with FF
National bits Sa4 to Sa8	1
BER alarm limit	1E-3
BER alarm severity	B-level

6.10 Factory values

Recalling the default values does not affect the following settings that are considered as factory settings. When the factory settings are recalled, the values in this section and in Section 6.9 become effective.

Note

Recalling of factory settings can take up to 60 seconds.

Table 12. Factory values

Q1 address	2
Q1 rate	4800 bit/s

7 Maintaining DNT2Mi

This chapter describes what general information and statistics you can get on the equipment to be monitored. It also deals with possible alarms and faults.

You can access all this information using front panel or Q1 menus. The menus are described in detail in Chapters 8 and 9.

7.1 Getting general information

The front panel menu **Monitor Info** or the **Identifications** menu, branch **4** on the Q1 main menu, gives the name and type of the unit to be monitored, the codes and versions of HW units and programs to be used.

```
Identifications
Equipment name:
        DNT2Mi
Equipment type:
        DNT2Mi mp (T65680)
HW:
        Main    E65671.01 A
        Mux     E65633.01 A
SW:
        S65672.01 A0
Port 1:
        V.35 (DS 62604)
Port 2:
        X.21 (DS 62605)
Port 3:
        V.11 (DS 62603)
```

Figure 26. Example of general information

In this menu, only the name of the supervised unit is changeable. To change the name, select **Modify** (Q1 menu option **4,7,2,1**). Note that the maximum length of the name is 15 characters.

7.2 Monitoring alarms

The **Fault display** (see Figure 27) gives error information concerning the unit chosen. The information includes the name, which the user has given to the supervised device, supervision block, that is, the type of the device to be monitored, the type of a fault, and the fault status shown by the alarm class (A = urgent, B = non-urgent, AS = urgent, service alarm).

Figure 27. Example of Fault display

In the example above, the first line consists of the name given to the supervised device and alarm class (AS), the second line shows the supervision block, and the third the type of the fault.

Table 13 shows alarm information from port and line interfaces and alarms from the equipment itself.

Table 13. Alarms

Alarm source	Q1 message	Front panel message	Description
Port n	BER > 1E-6 (1E-3)		Bit error rate worse than the set limit in port 1, 2, or 3
	Loss of incoming signal	No incoming signal	DTE off or not connected to the DTE interface adapter of port 1, 2, or 3
	Blocked from use		Timeslot allocation mismatch. The number of timeslots allocated to the port does not match with the speed used in the line.
	Test mode	CT140 ON	DTE is driving circuit 140 (RL) active in port 1, 2, or 3
		CT141 ON	DTE is driving circuit 141 (LL) active in port 1, 2, or 3
		Remote test	Remotely controlled digital loop in port 1, 2, or 3
	–	No adapter	The DTE interface adapter not in place in port 1, 2, or 3
	AIS 2M	AIS	G.704 AIS message in port 1, 2, or 3
	Loss of frame alignment	Framing lost	G.704 framing lost in port 1, 2, or 3
	CRC multiframe alignment lost	CRC MFA lost	G.704 multiframe alignment lost in port 1, 2, or 3
	End to end frame loss	V.110 frame lost	V.110 framing lost in port 2 or 3
	Far-end alarm		Bit 3 (A-bit) of the frame not containing the frame alignment signal
Line	Loss of frame alignment	Framing lost	Line frame synchronisation lost (G.704)
	BER > 1E-6 (1E-3)		Bit error rate worse than the set limit
	No incoming line signal	No line signal	Line failure or remote equipment is faulty or switched off
	Test mode	–	Line in test mode
Equipment	Synch. clock fault		Failure in synchronisation source, for example line signal missing when the line timing mode has been selected.

7.3 Testing

DNT2Mi tests can be controlled via the front panel or using Q1 menus.

The following tests are available for testing a DNT2Mi terminal:

Table 14. Tests available for DNT2Mi

	Front panel	**Q1 management**	**Automatic control**	**Note**
Equipment tests				
Power up test			After power is switched on	
Self test	Equipment self test	Self test **(5,4)**		
Line interface test				
Network test loop ITU-T X.150 loop 2 Data coming from the line is looped back to the line.	Line DL test	Loop to line (DL)		See Figure “Network test loop (all ports)” after this table.
Dedicated port tests				
Local test loop ITU-T X.150 loop 3 Data coming from the DTE is looped back to the DTE.	Port LL test	Loop to DTE (LL) **(5,2,#,3)**	V.xx Circuit 141 or X.21 loop 3 command	Automatic control can be disabled by setting circuit 141 in the ‘Not in use’ state. See Figure “Local test loop in a port” after this table.
Network test loop ITU-T X.150 loop 2 Data coming from the line is looped back to the line.	Port DL test	Loop to line (DL) **(5,2,#,2)**		See Figure “Network test loop (single-port)” after this table.

Table 14. Tests available for DNT2Mi (Continued)

	Front panel	Q1 management	Automatic control	Note
PRBS tests ITU-T V.52 2^9-1 test pattern Transmitter and receiver towards the line.	Port TR test	Tx-Rx test (TR) **(5,2,#,4)**		See Figure “PRBS (2^9-1) test (transmitter / receiver)” after this table.
Remotely controlled network test loop ITU-T X.150 loop 2 at remote end Data coming from the line is looped back to the line. Activated at the local port and a loop is established at the remote end.	Port RL test		V.xx Circuit 140 or X.21 loop 2 command	Automatic control can be disabled by setting circuit 140 in the ‘Not in use’ state at the local port. Establishment of the requested loop can be disabled by setting “Remote loop not allowed” at the remote end. See Figure “Remotely controlled network test loop” after this table.
Remotely controlled network test loop with PRBS test pattern ITU-T X.150 loop 2 at remote end and ITU-T V.52 2^9-1 test pattern Transmitter and receiver at the local port.	Port RLTR test			Establishment of the requested loop can be disabled by setting “Remote loop not allowed” at the remote end. See Figure “Remotely controlled network test loop with PRBS test pattern” after this table.

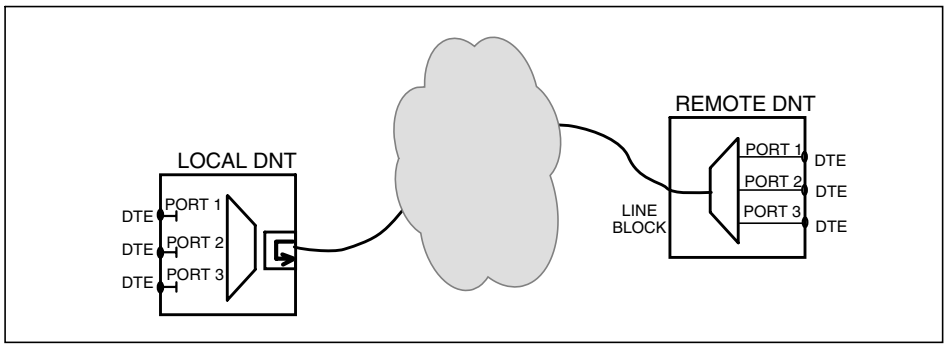


Figure 28. Network test loop (all ports)

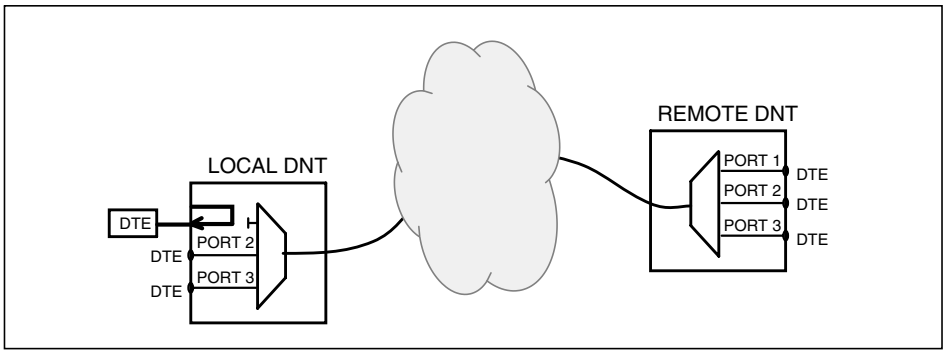


Figure 29. Local test loop in a port

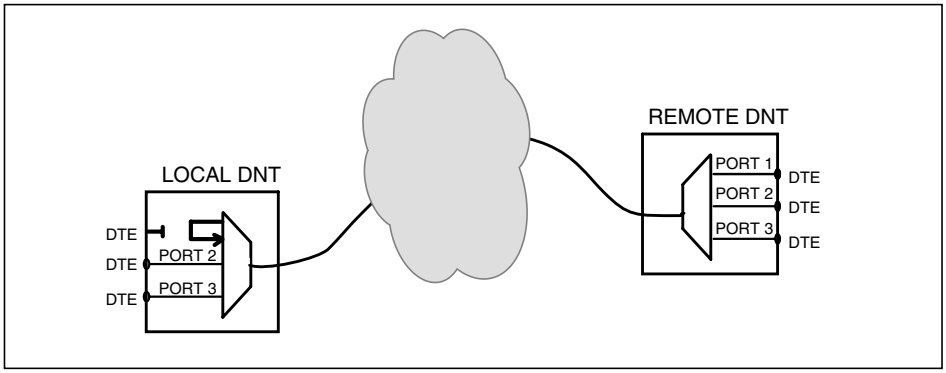


Figure 30. Network test loop (single-port)

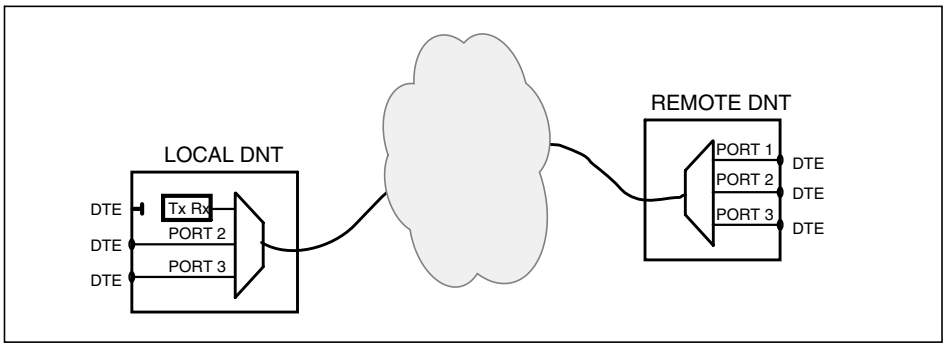


Figure 31. PRBS (2^9-1) test (transmitter/receiver)

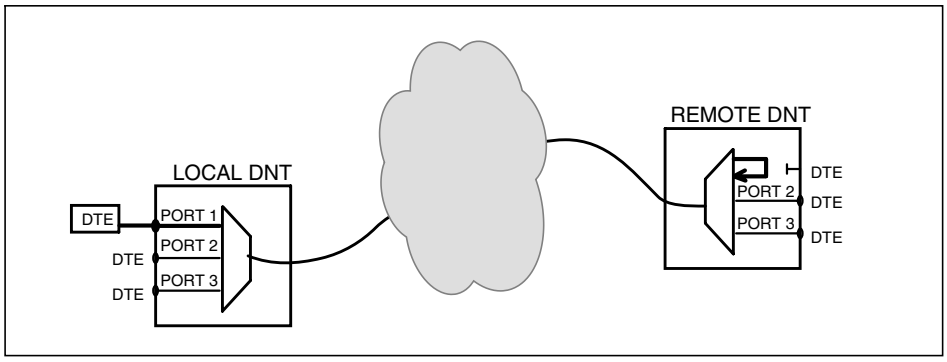


Figure 32. Remotely controlled network test loop

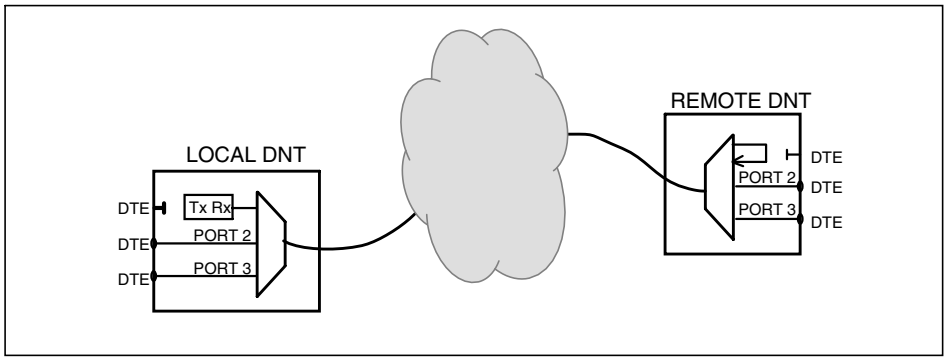


Figure 33. Remotely controlled network test loop with PRBS test pattern

7.4 Checking measurements and statistics

Measurements and statistics to be checked through the front panel control and Q1 measurements cover various quality parameters, line and error counters.

The parameters that can be viewed through the front panel menus or the Q1 menus **Measurement** (main menu branch **7** and **Statistics** (main menu branch **8**) are listed below.

Measurements via the front panel or Q1

- Noise margin
- Rx level
- Tx level

- Line attenuation
- Line voltage (remote-powered)

Attenuation can be 0 to 41 dB.

DNT statistics via the front panel or Q1

Signal qualities of the selected 15-minute periods (4 periods with front panel menus and 100 with Q1) and 24-hour periods (4 periods with front panel menus and 30 with Q1) and since the last reset, according to Rec. G.826, are indicated by the quality parameters in Table 15.

Table 15. Statistics values via Q1

Information	Abbreviation and/or ratio	Description
Total time	TT	Time passed since the last reset.
Unavailability time	UAT (Rx, Tx)	Time during which severely errored seconds have occurred.
Errored seconds	ES (Rx, Tx)	Number of errored seconds.
Severely errored seconds	SES (Rx, Tx)	Number of seconds during which ≥ 30% blocks are errored.
Background block errors	BBE (Rx)	Number of errored blocks except blocks during severely errored seconds and unavailable time. The block size depends on the used line rate.
Unavailability time ratio	UATR (Rx, Tx)	Ratio of unavailability time to the total time during the last 15 minutes or 24 hours.
Errored seconds ratio	ESR (Rx, Tx)	Ratio of errored seconds to the total of seconds in the available time during the last 15 minutes or 24 hours.
Severely errored seconds ratio	SESR (Rx, Tx)	Ratio of severely errored seconds to the total of seconds in the available time during the last 15 minutes or 24 hours.
Background block error ratio	BBER (Rx)	Ratio of background block errors to the total of blocks during the last 15 minutes or 24 hours, except blocks during severely errored blocks and unavailable time.

System counters via Q1

- Number of CPU resets and the time passed since the last reset.

8 Using front panel menus

This chapter describes the front panel menus and how to navigate between them using the front panel keys.

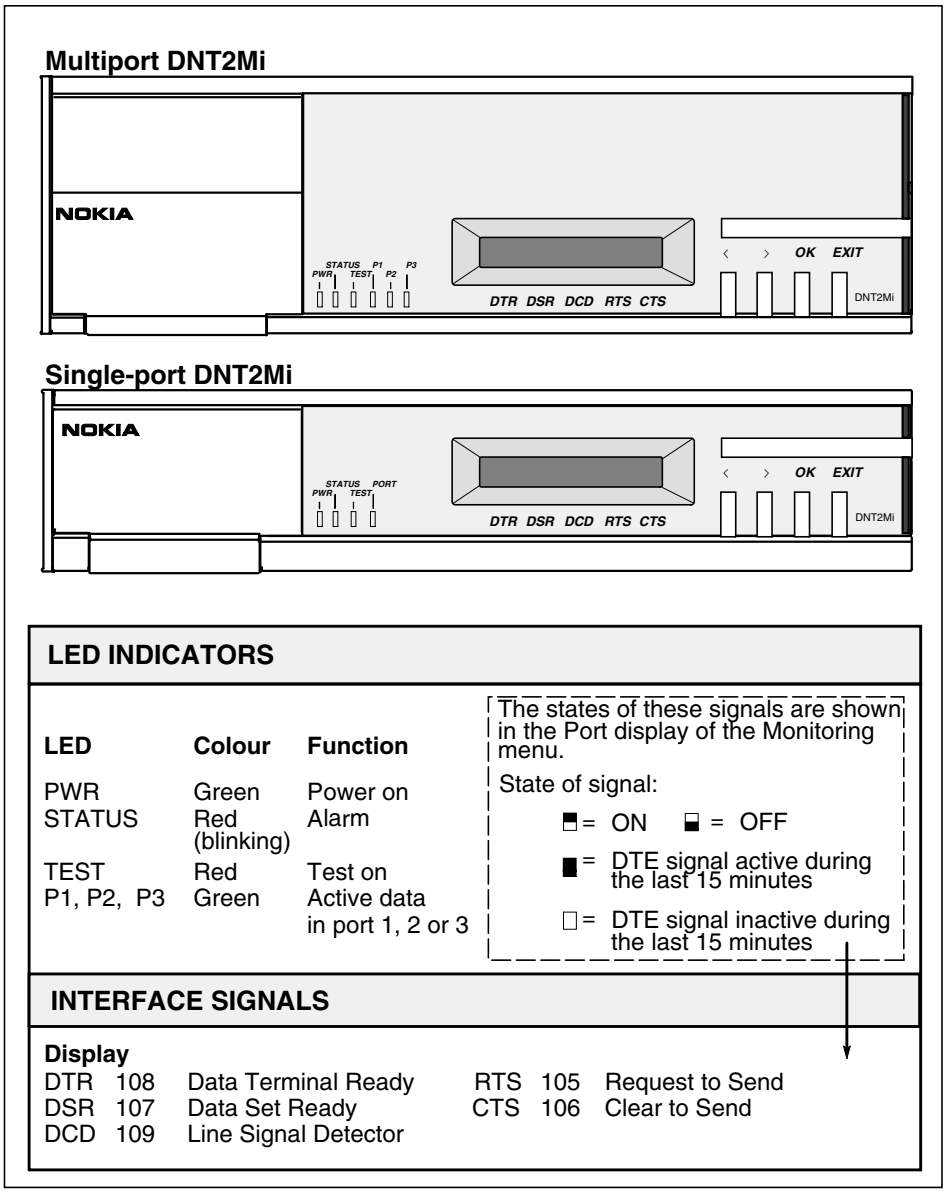


Figure 34. Front panel functions

The following information is useful to know when working with the menus:

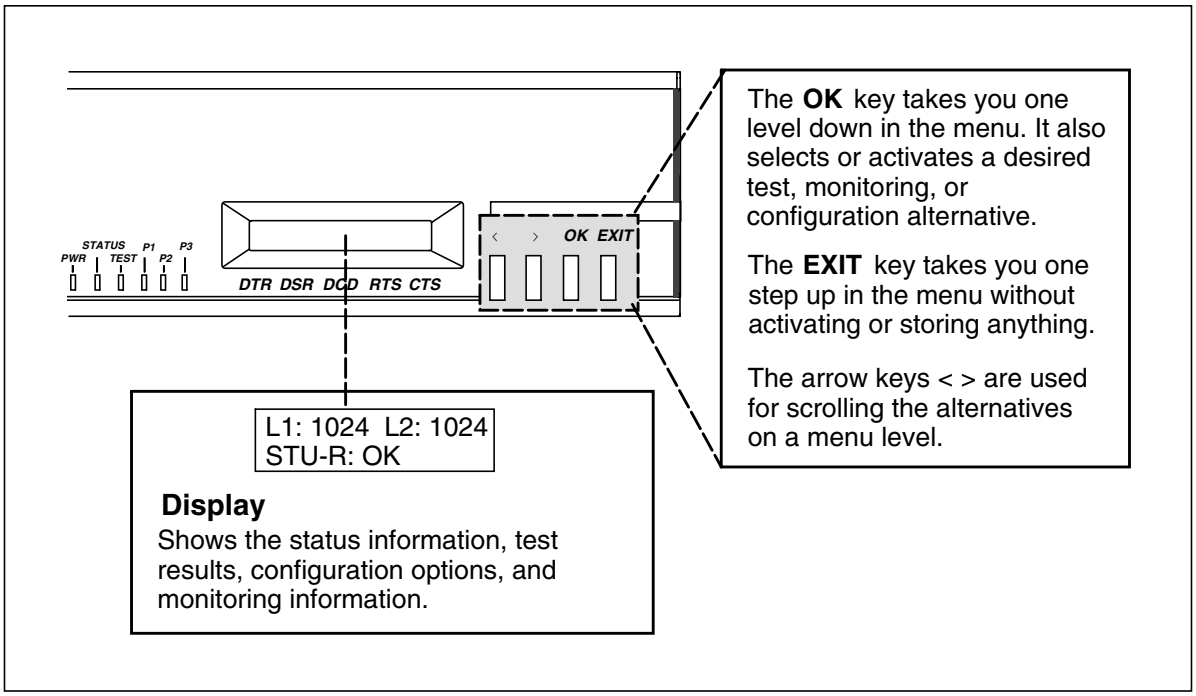


Figure 35. Front panel actions

The menu structure is presented in full detail on the following sections.

If **L2: 1024** is shown on the left side of the display, it indicates that the lines are cross-connected. This can occur in the STU-R, 4-wire mode only and does not affect data flow.

8.1 Main menu levels

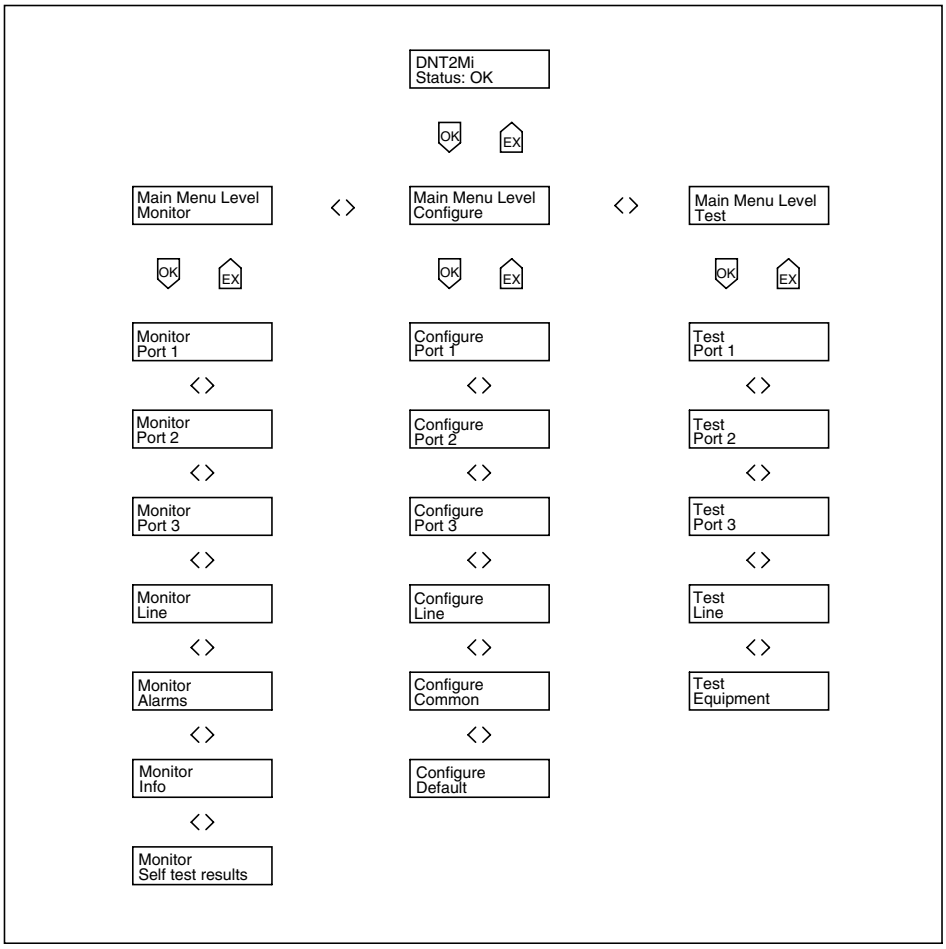


Figure 36. Front panel main menus

8.2 Configuring DNT2Mi

When configuring DNT2Mi, take the following into account: at entering a menu level where you can change unit's configuration parameters, a configuration option on the bottom row starts to blink indicating that you are allowed to change it.

Note that the menu has an individual configuration parameter set for each port type.

The modem automatically detects the port adapter type in use and shows the corresponding configuration parameters under the **Configure: Port** menu option.

Note

The text **Save? (OK/Exit)** appears in the display only when changes have been made to the edit buffer. If the OK key is pressed, the changes are stored and activated. Pressing the EXIT key ends the configuration procedure and nothing is changed.

Note

The asterisk (*) indicates whether a parameter value is currently stored in the non-volatile memory (that is, the parameter value is used also the next time when the modem is switched on).

Note

If the port adapter is not in place, the menu shows the port parameters that were used previously or, alternatively, the V-type port parameters.

8.2.1 Configuring a port

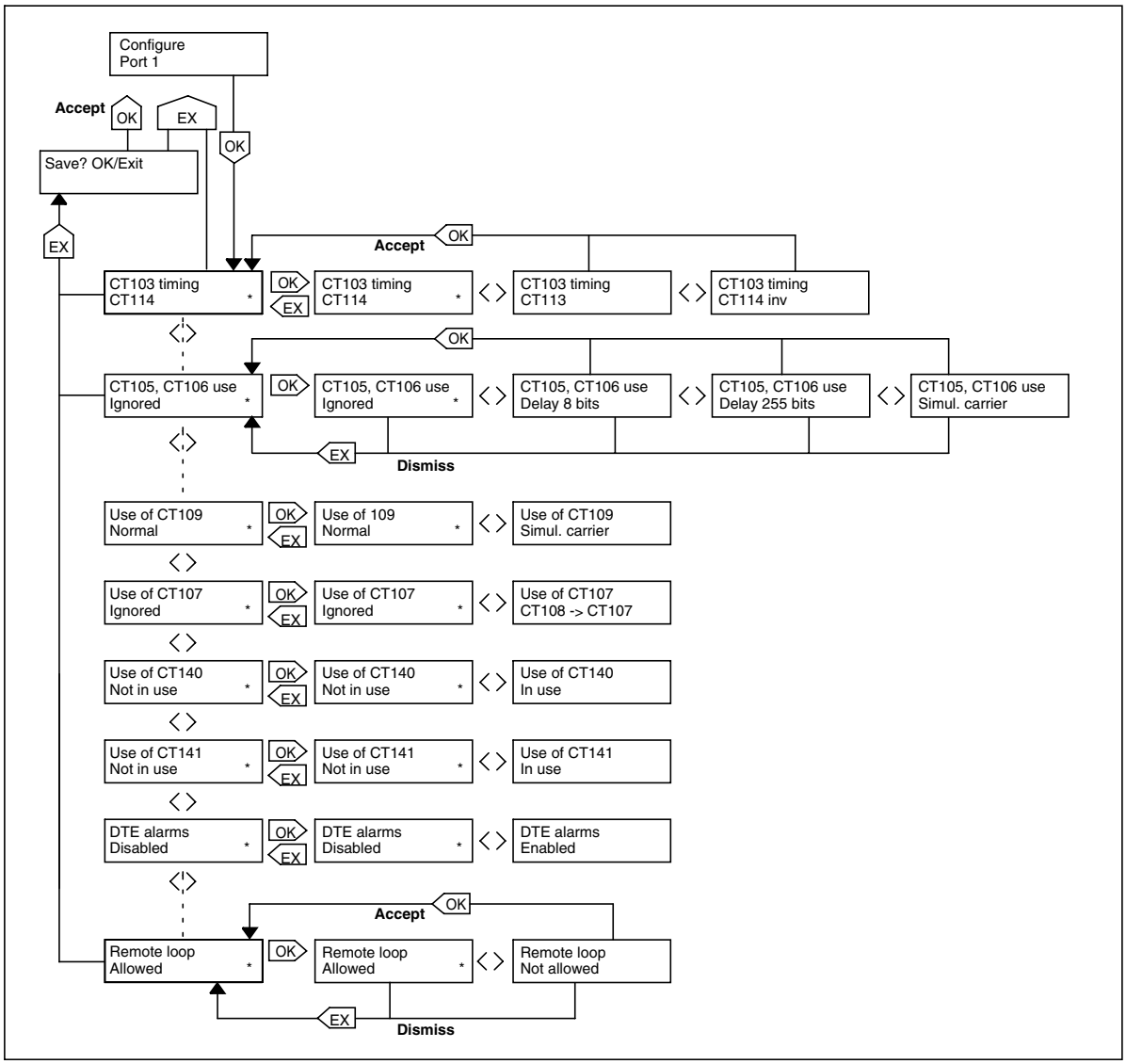


Figure 37. Configuring port 1 / V.xx type interfaces

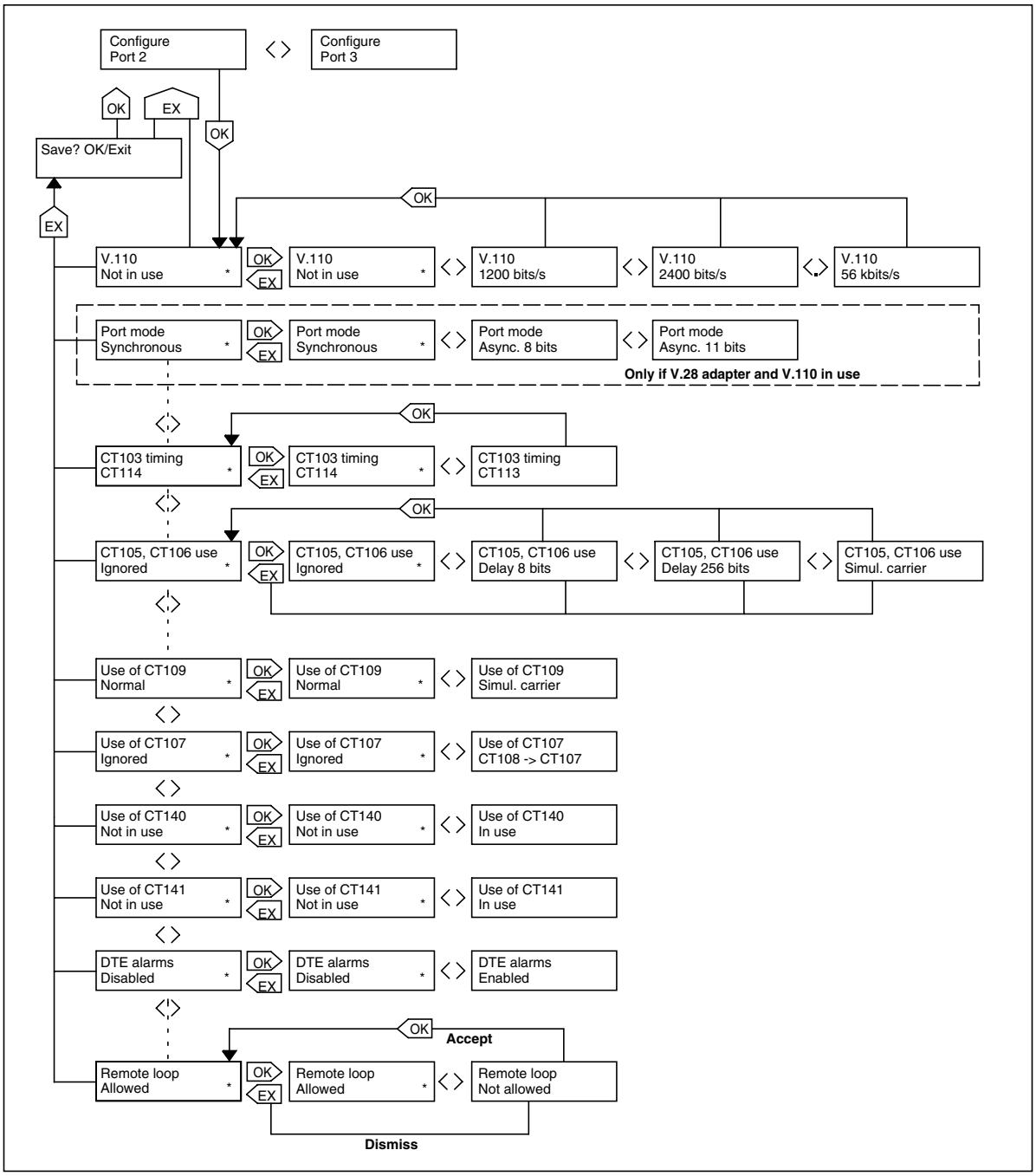


Figure 38. Configuring port 2 and port 3 / V.xx type interfaces

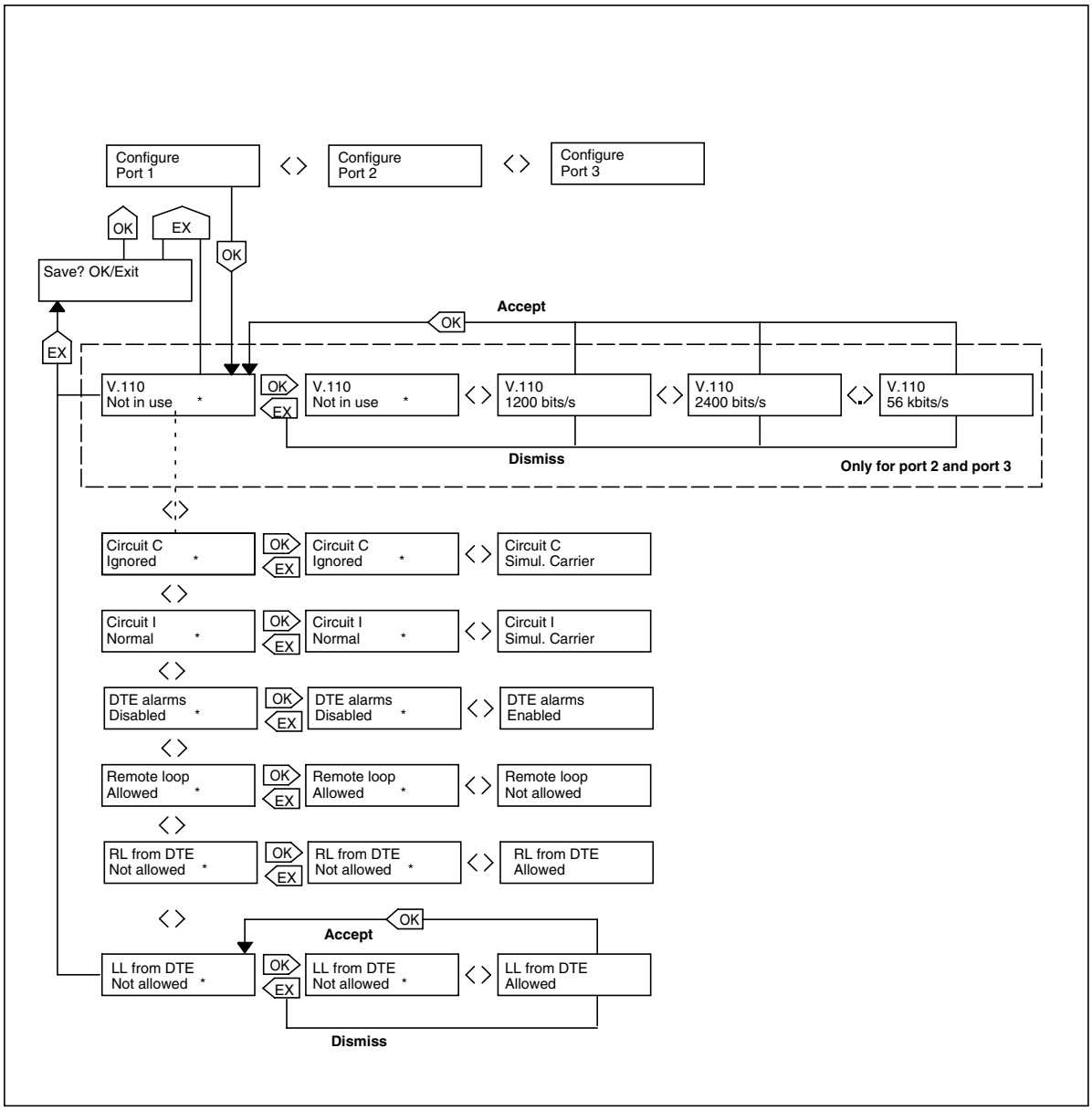


Figure 39. Configuring ports / X.21 interfaces

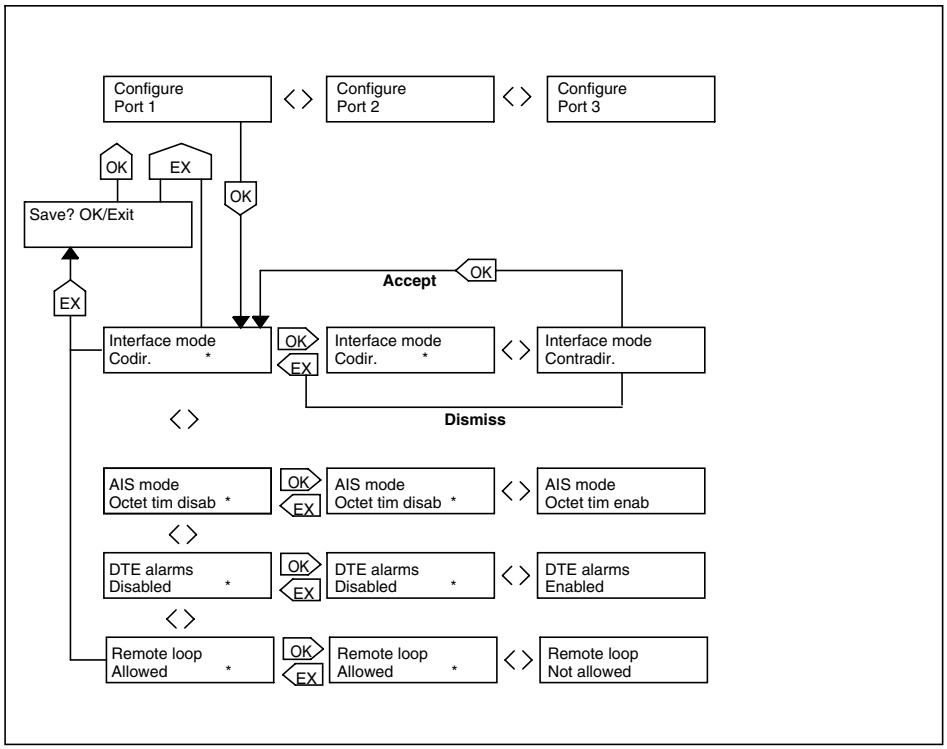


Figure 40. Configuring ports / G.703/64k interfaces

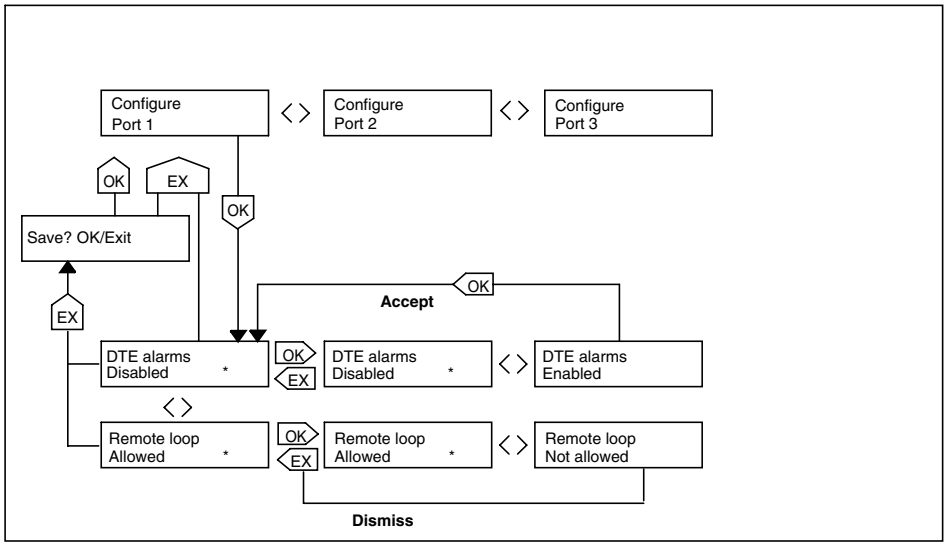


Figure 41. Configuring ports / G.703 interfaces

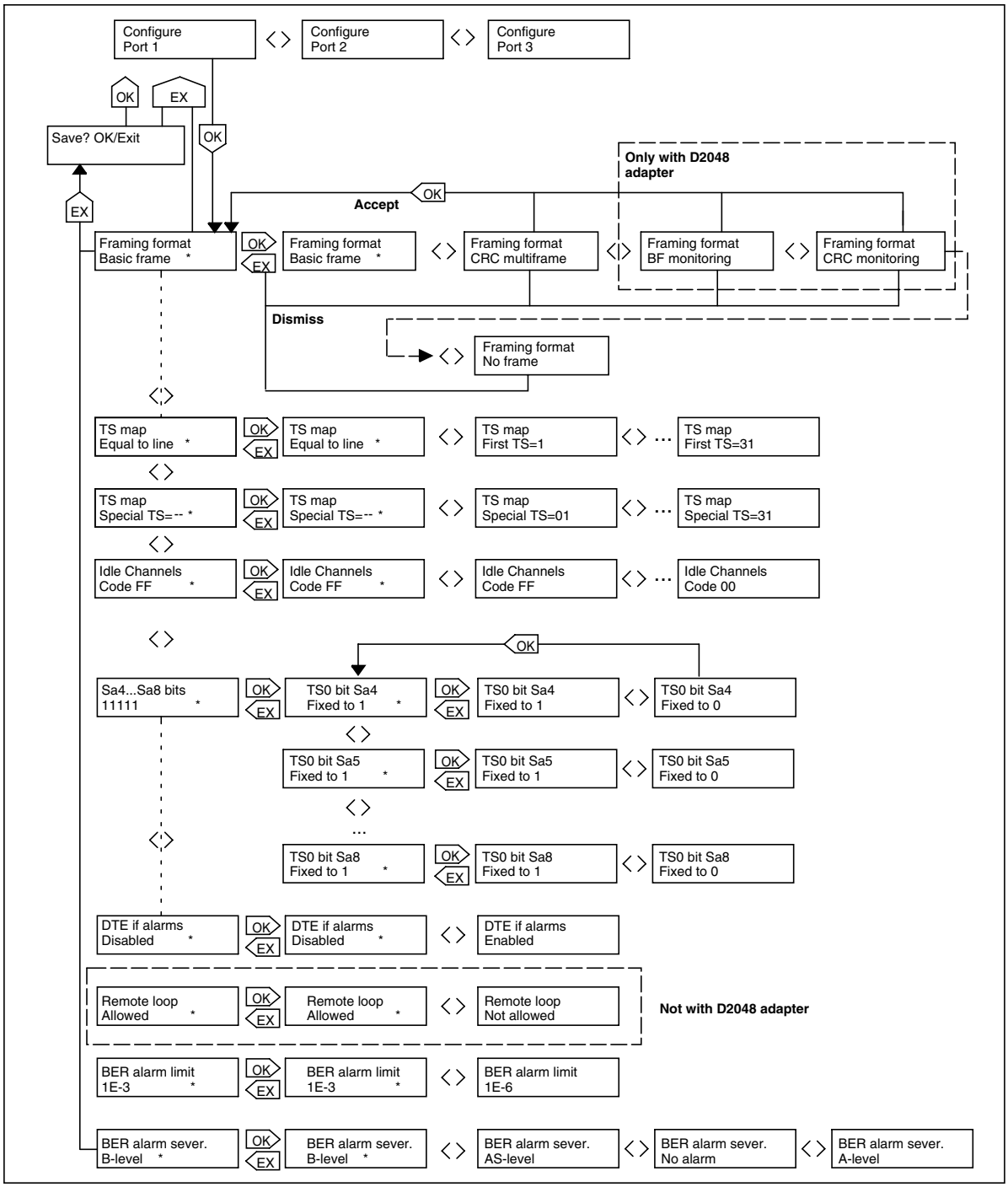


Figure 42. Configuring ports / G.704 interfaces

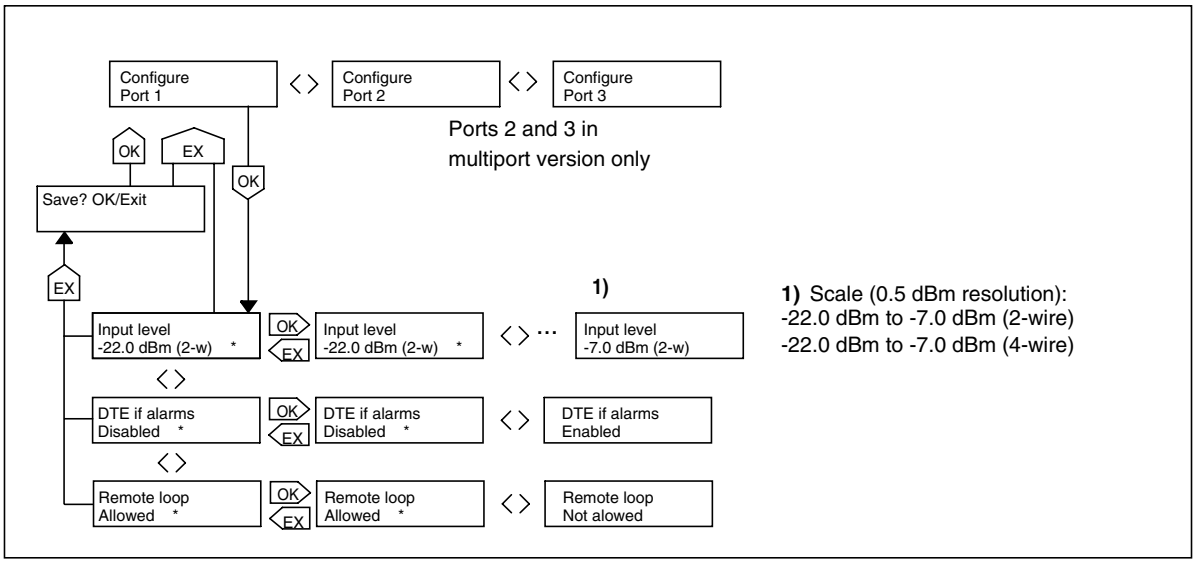


Figure 43. Configuring ports / VF interfaces

8.2.2 Configuring a line

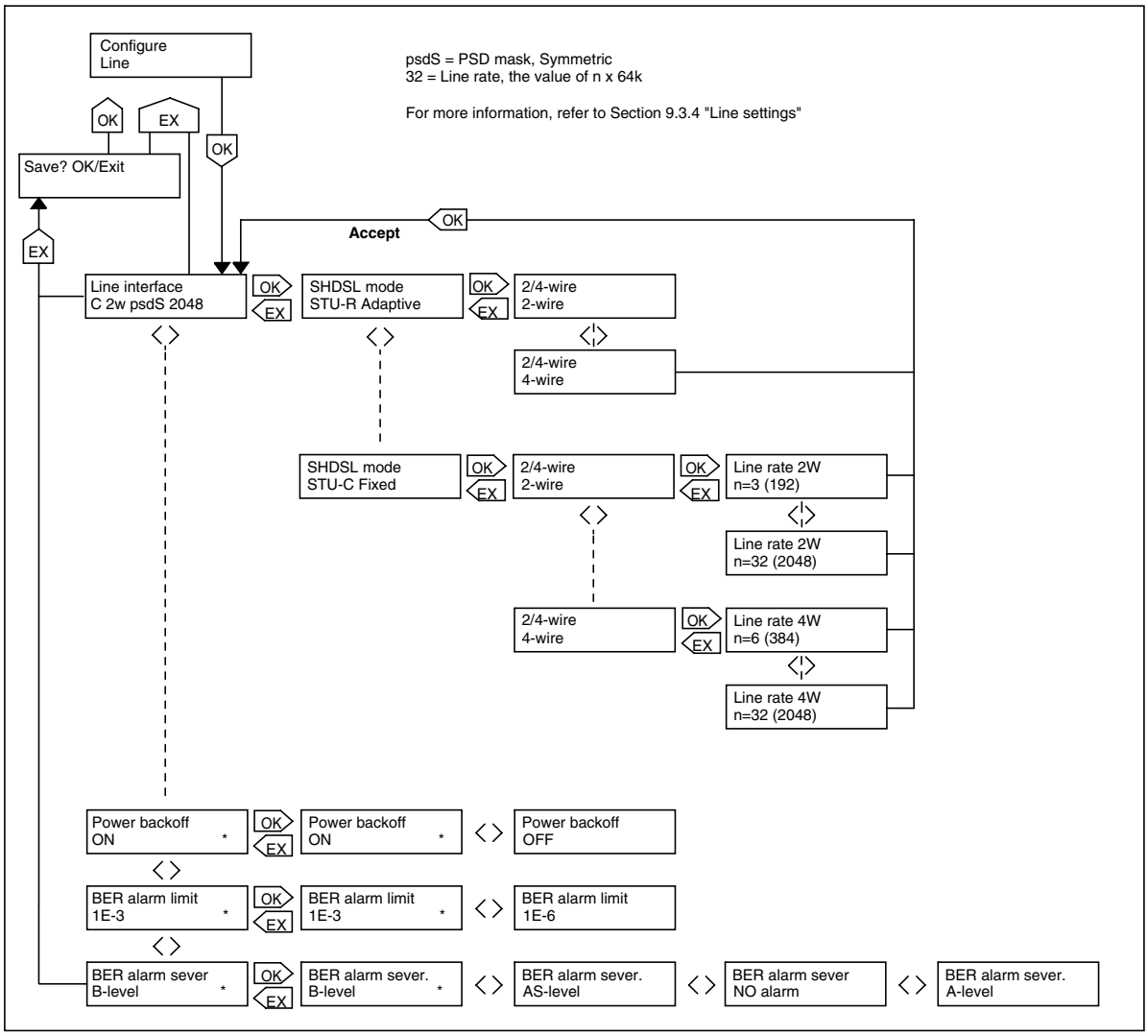


Figure 44. Front panel menus for line settings

8.2.3 Configuring common settings

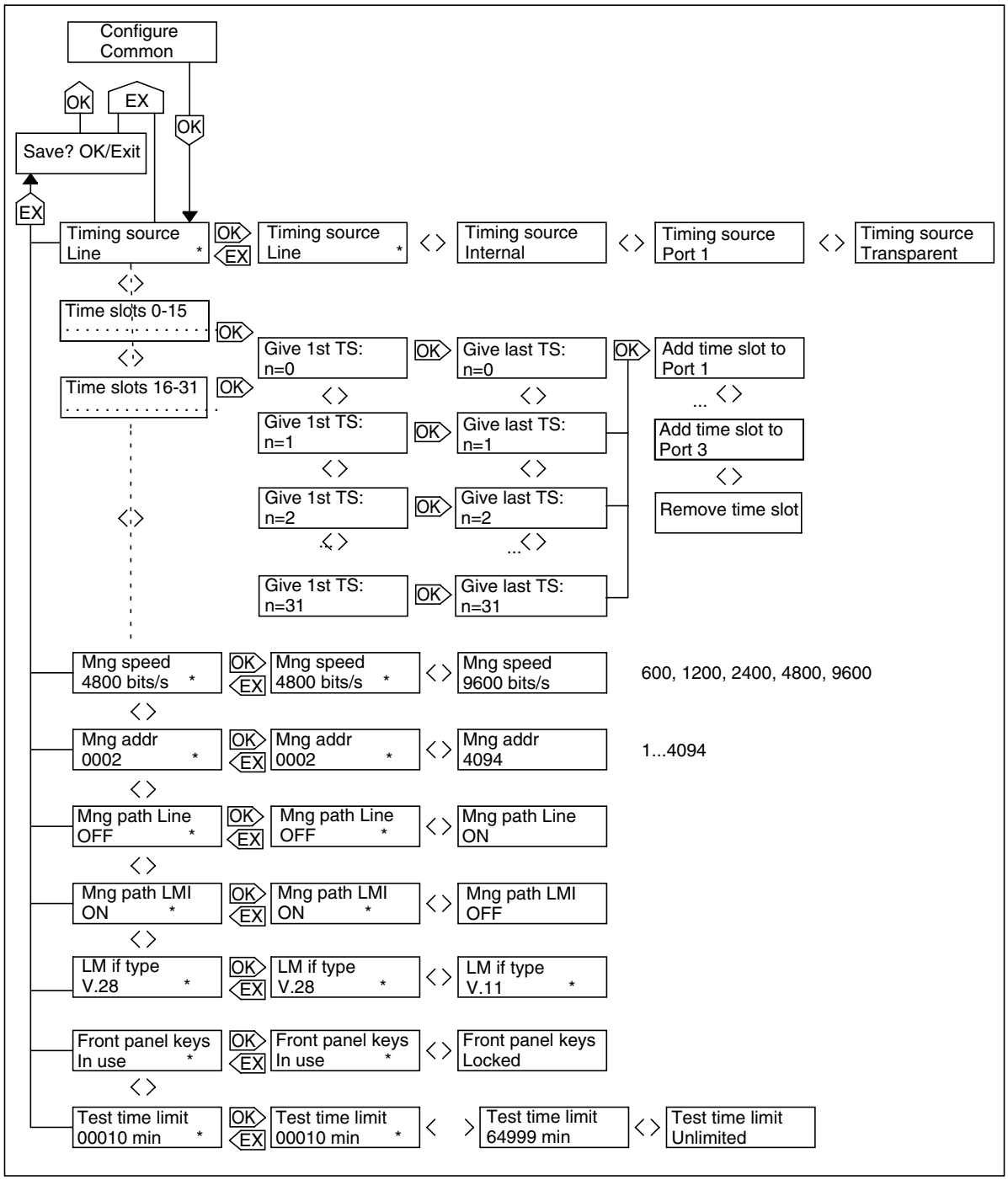


Figure 45. Front panel menus for common settings

8.2.4 Default settings

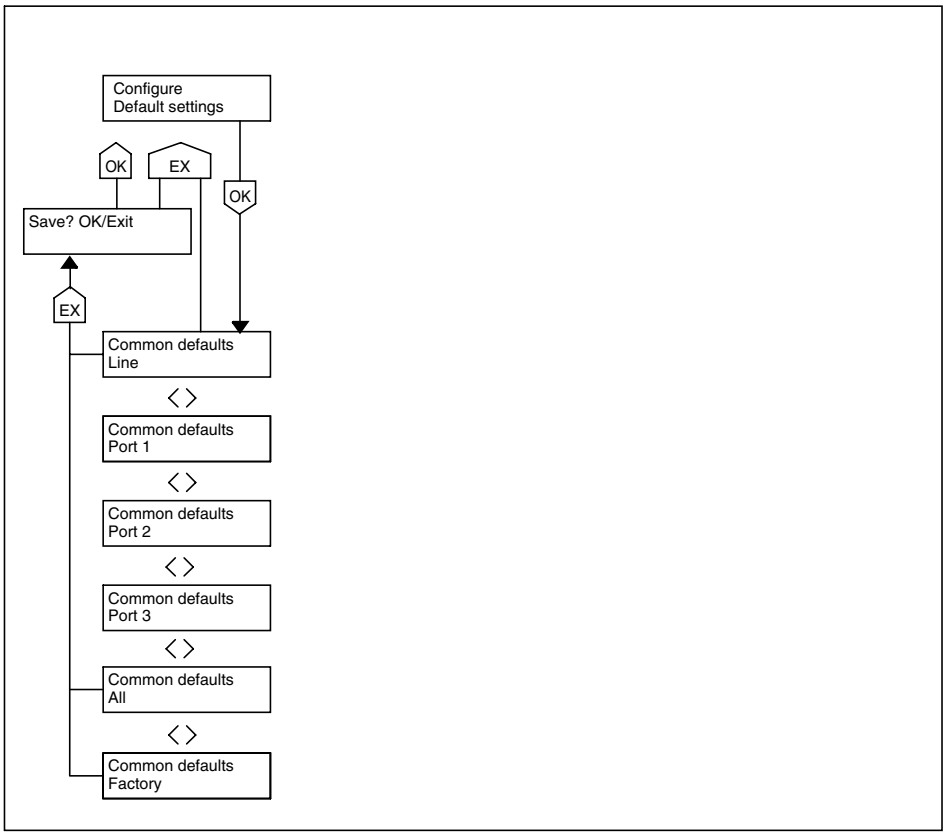


Figure 46. Front panel menus for default settings

8.3 Testing DNT2Mi

8.3.1 Testing a port

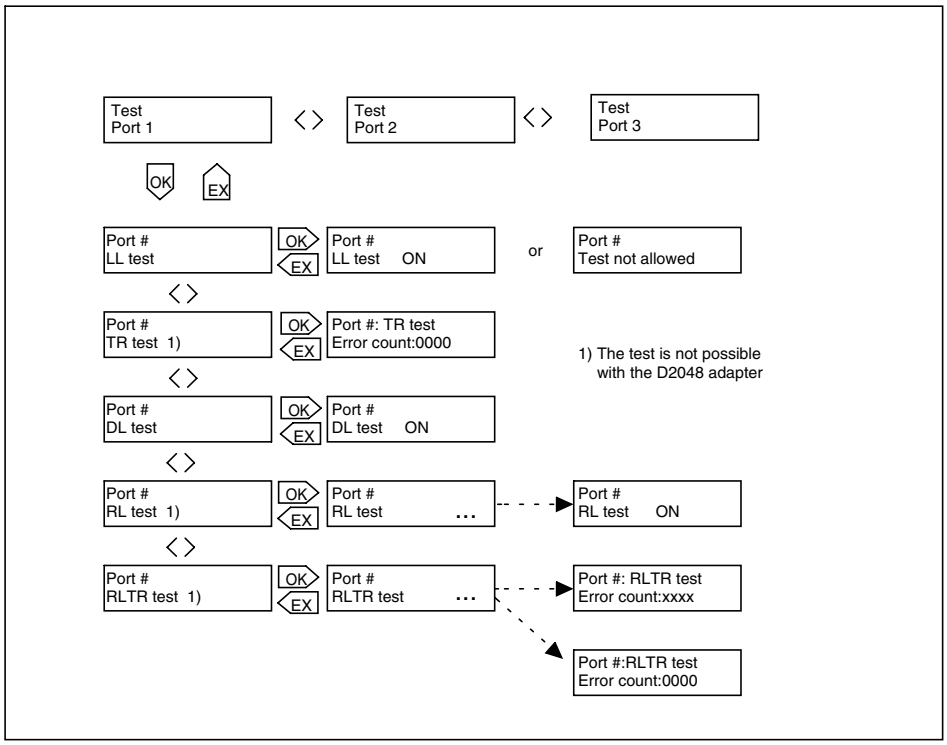


Figure 47. Front panel menus for testing a port

8.3.2 Testing a line

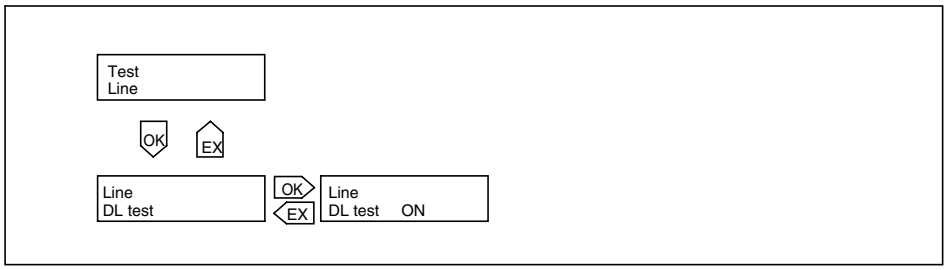


Figure 48. Front panel menus for testing a line

8.3.3 Testing the equipment

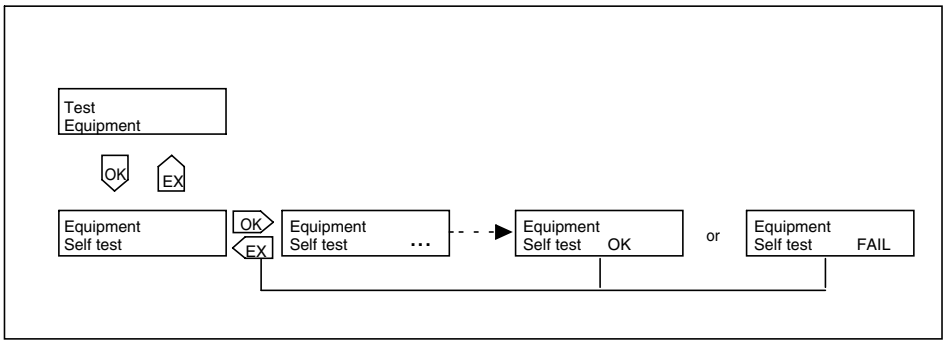


Figure 49. Front panel menus for testing the equipment

8.4 Monitoring DNT2Mi

8.4.1 Monitoring a port

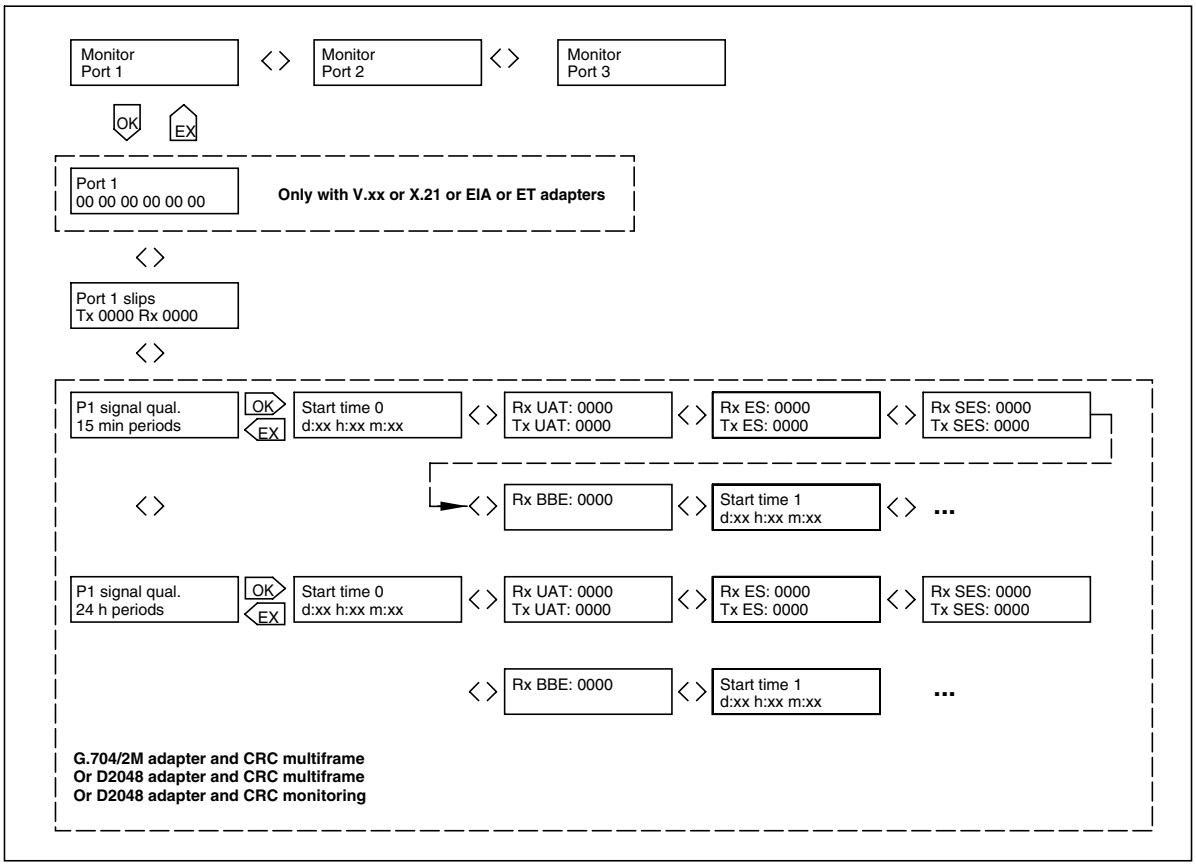


Figure 50. Front panel menus for monitoring a port

8.4.2 Monitoring a line

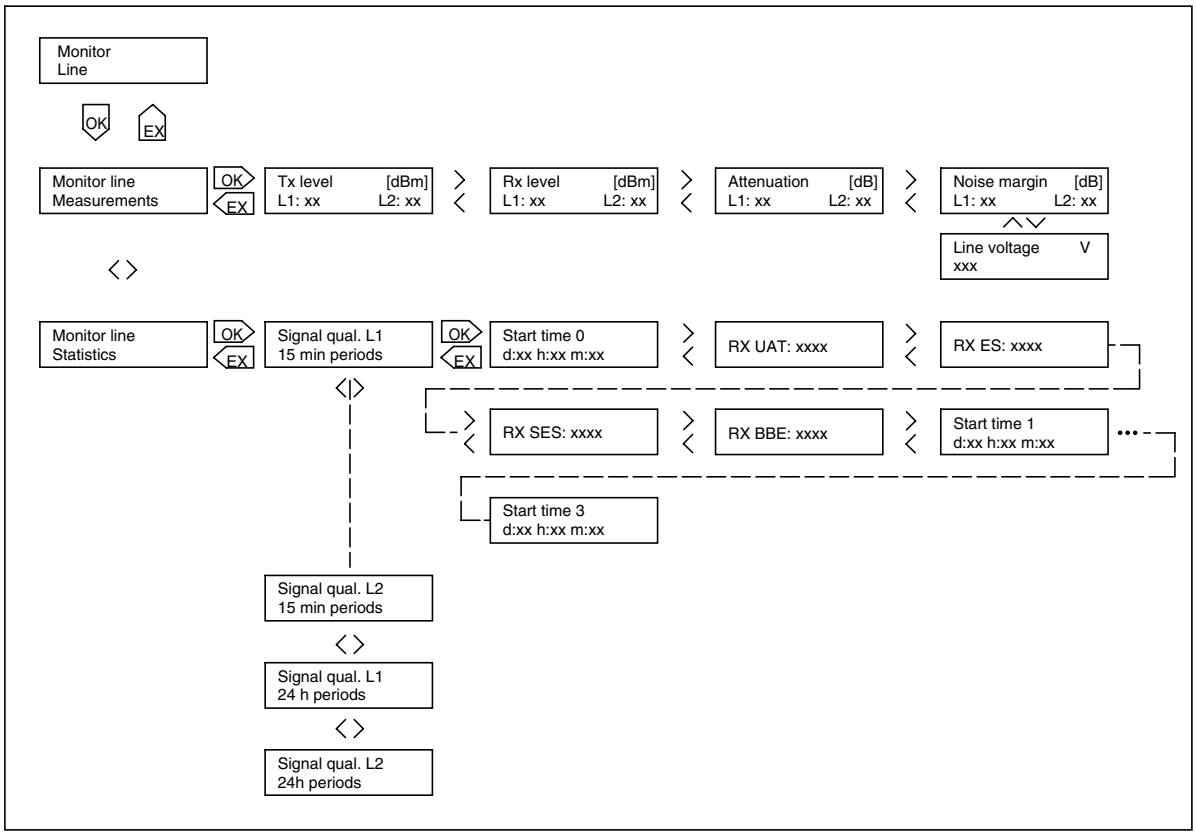


Figure 51. Front panel menus for monitoring a line

8.4.3 Monitoring alarms

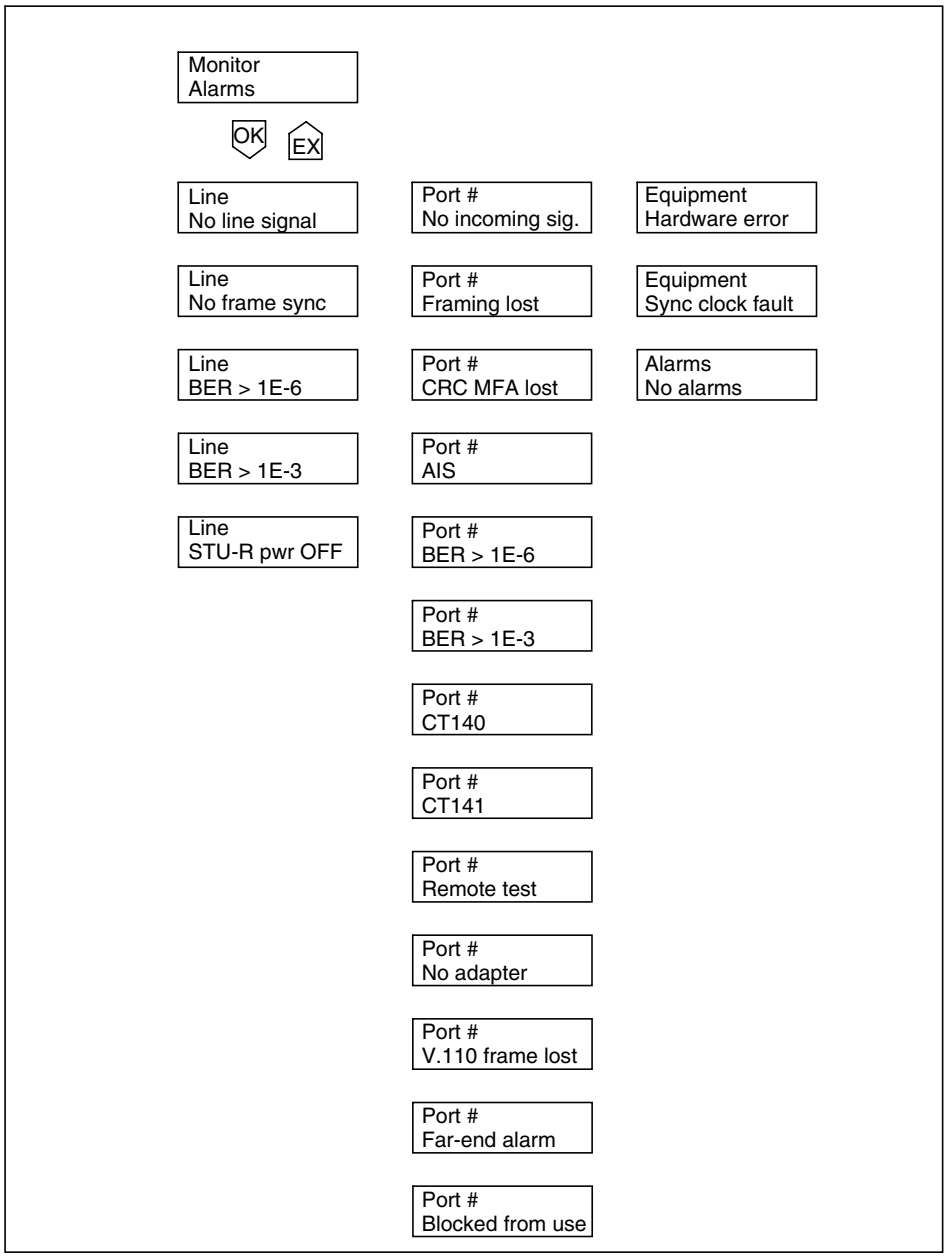


Figure 52. Front panel menus for monitoring alarms

8.4.4 Monitoring equipment information

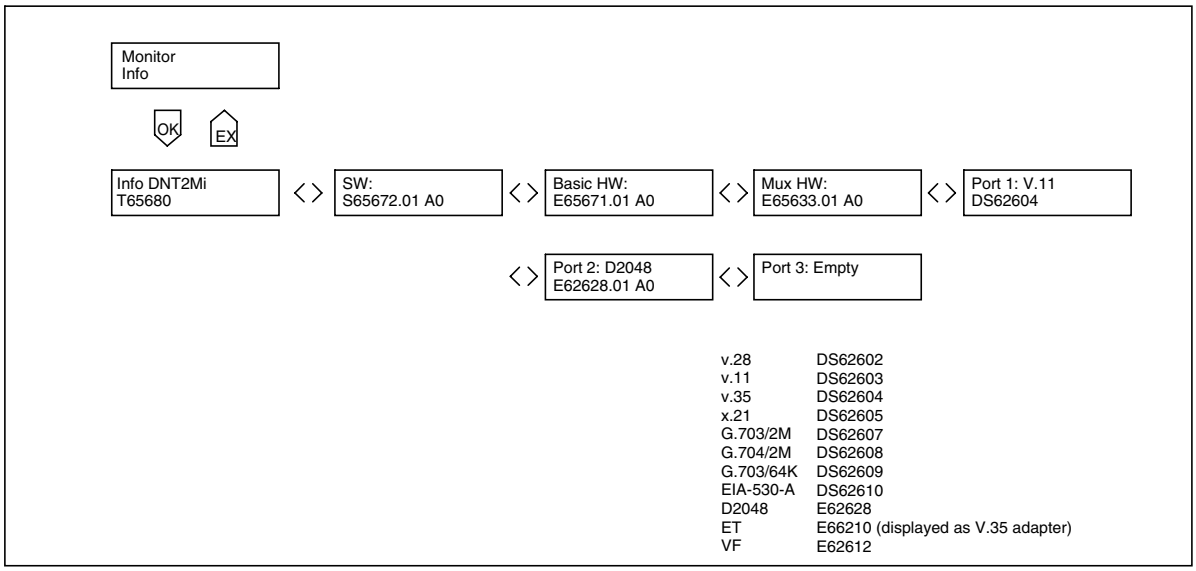


Figure 53. Front panel menus for monitoring equipment information

8.4.5 Self testing

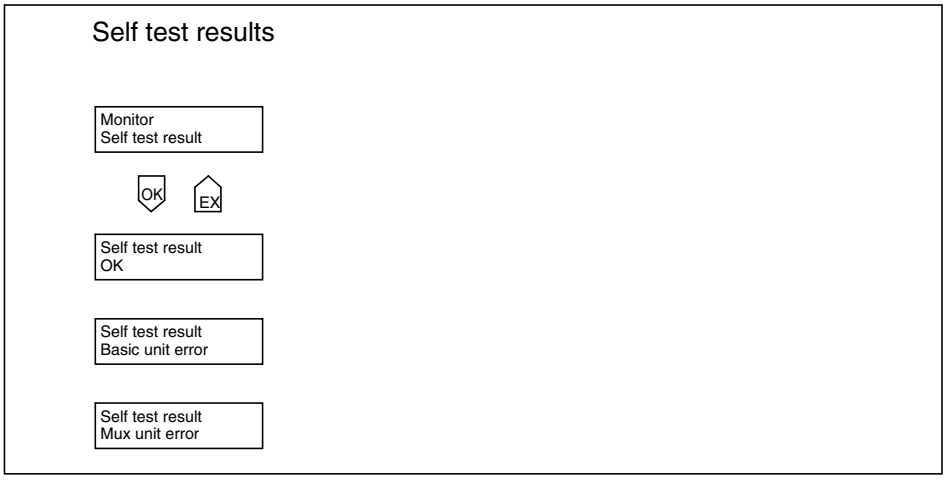


Figure 54. Front panel menus for self testing

9 Using Q1 menus

9.1 General

The Q1 main menu level contains the following 11 menus, of which those available in DNT2Mi are typed in boldface in the list below:

1. **Fault display**
2. Local alarm cancel
3. Reset local cancel
4. **Identifications**
5. **Controls** *(temporary)*
6. **Settings** *(permanent)*
7. **Measurements**
8. **Statistics**
9. Testing
10. **User privileges**
11. Miscellaneous

The options of the DNT2Mi menus are described in more detail in the following subsections.

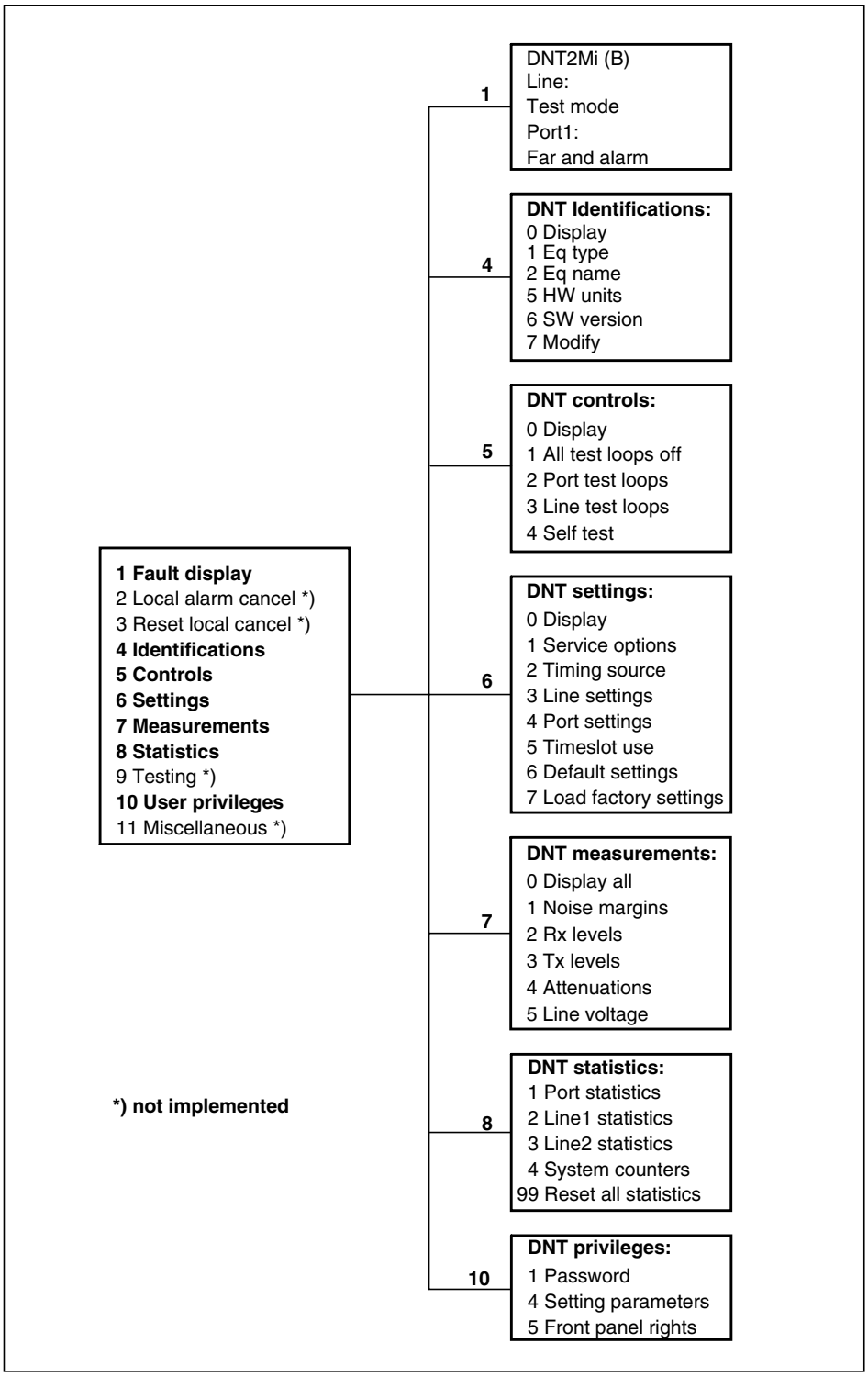


Figure 55. Main Q1 menu structure

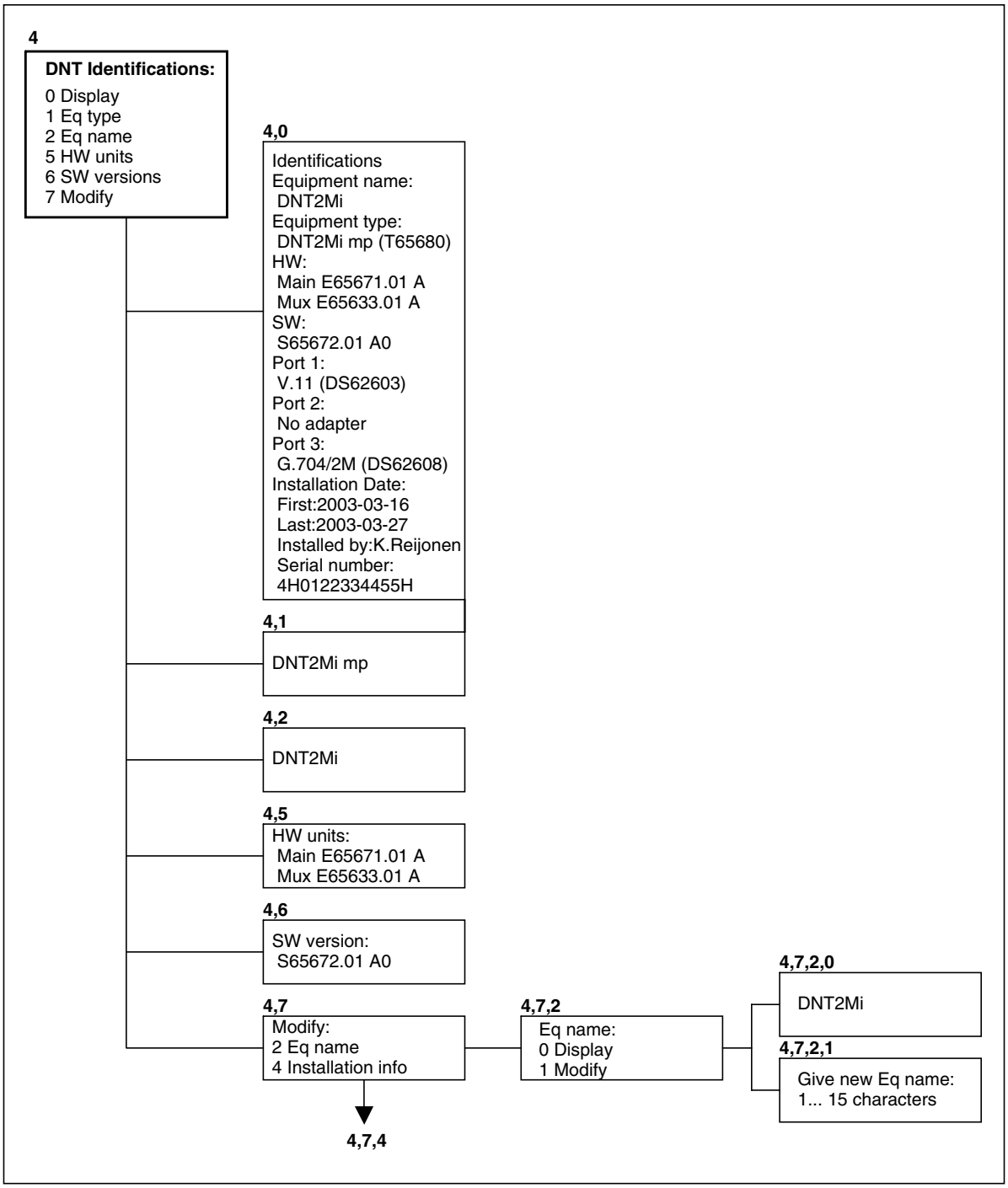


Figure 56. Identifications menu

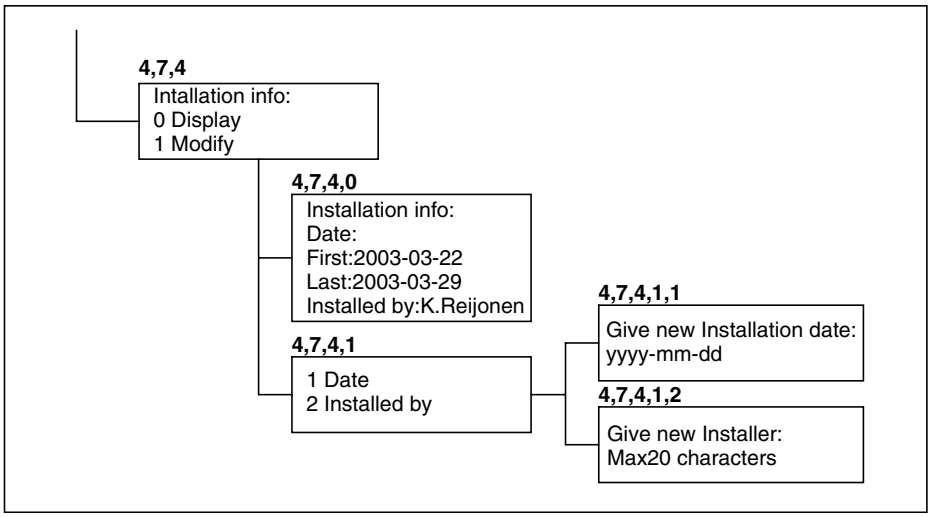


Figure 57. Identifications menu (continued)

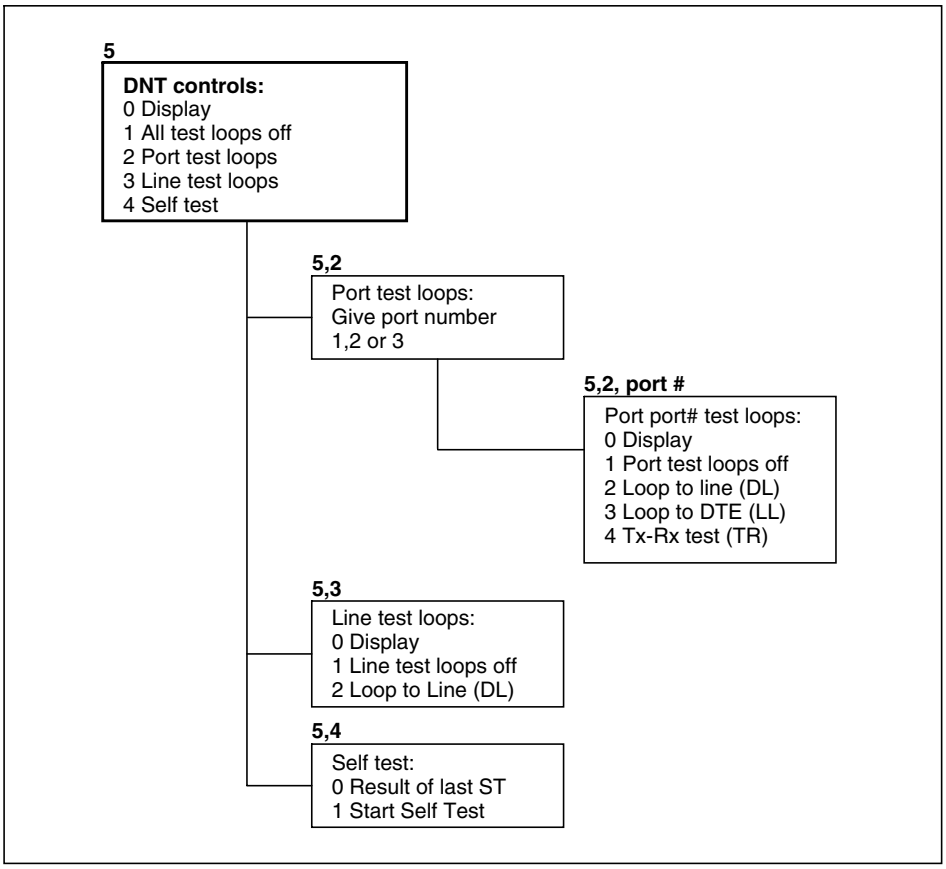


Figure 58. Controls menu

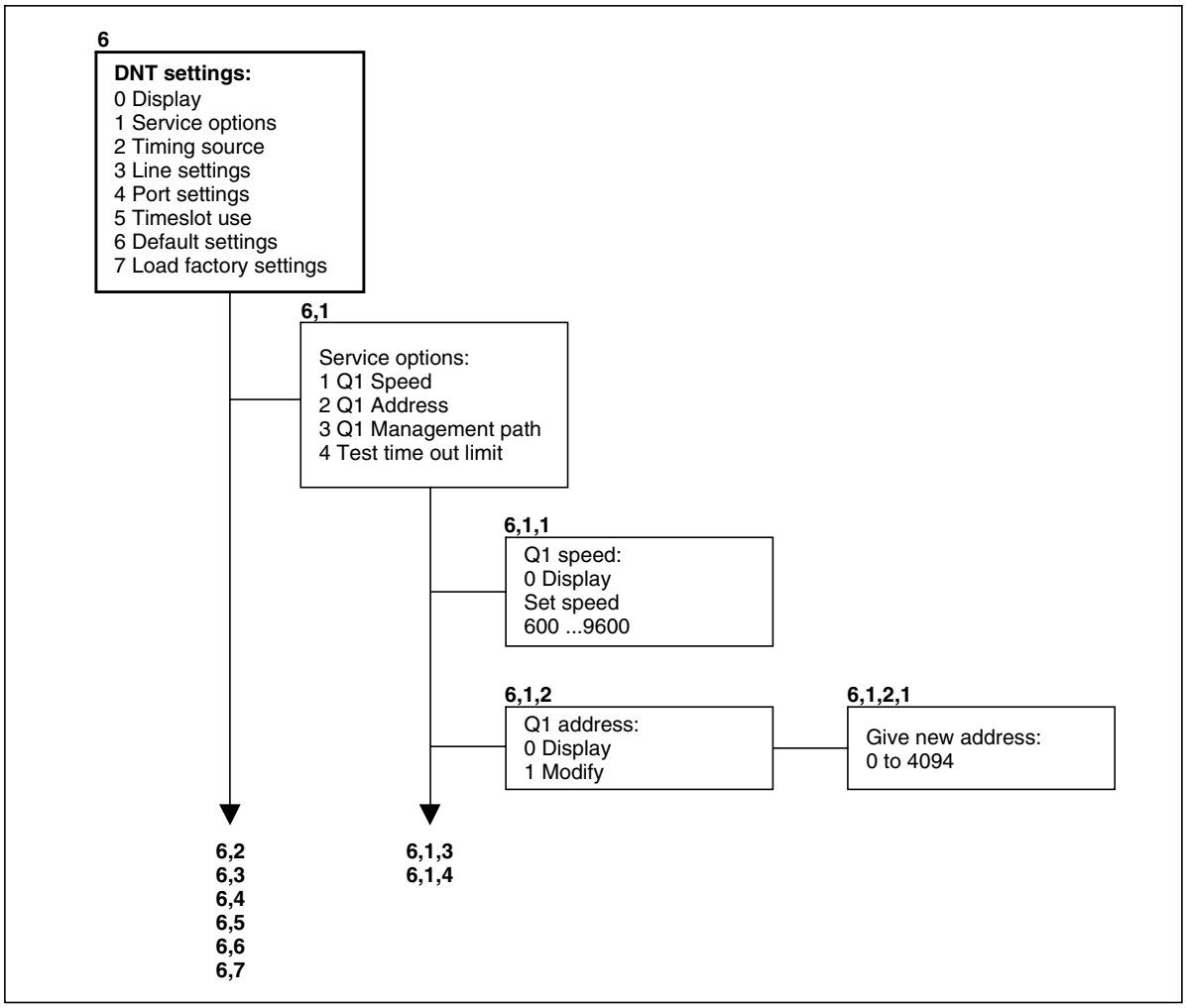


Figure 59. Settings menu structure

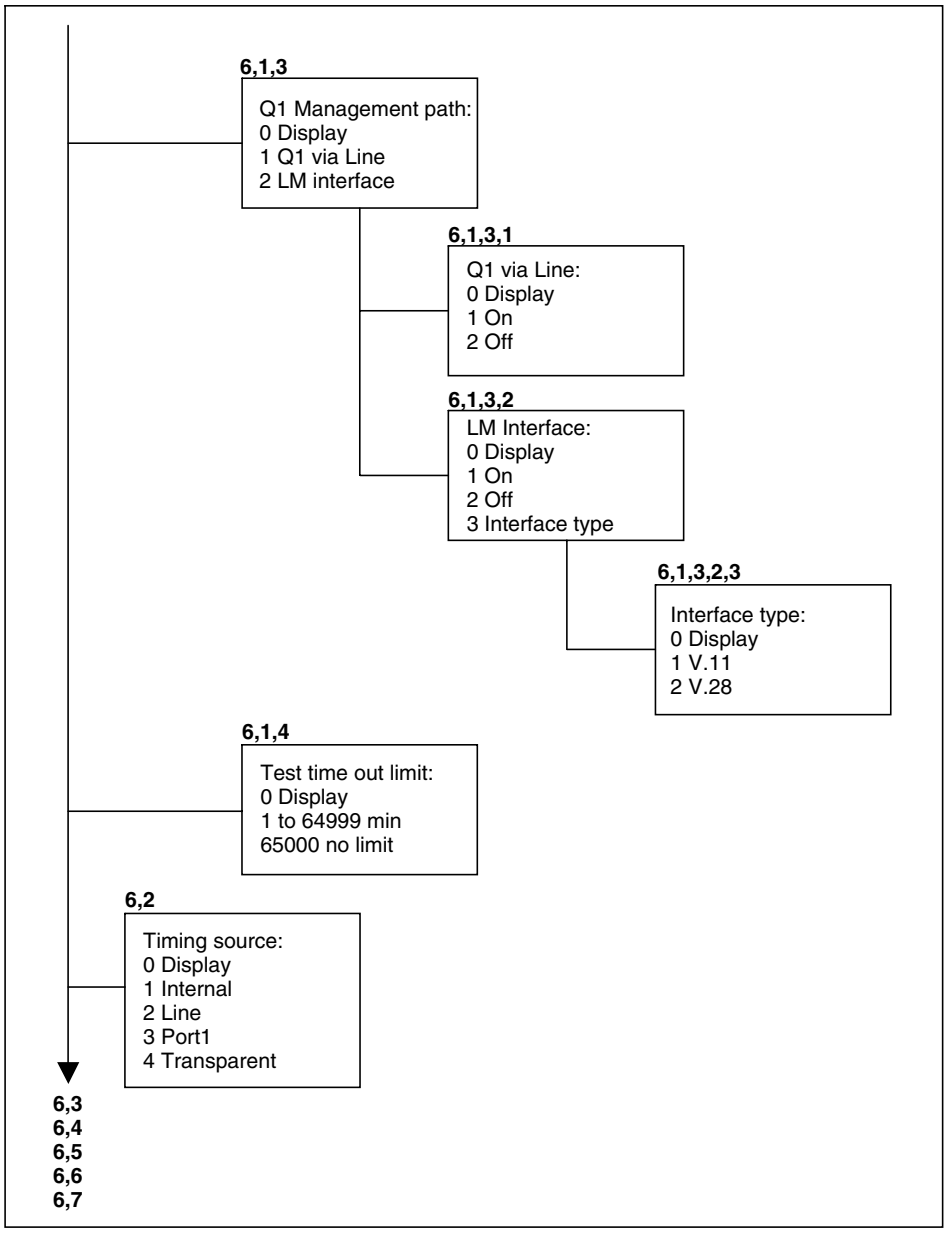


Figure 60. Settings menu structure (continued)

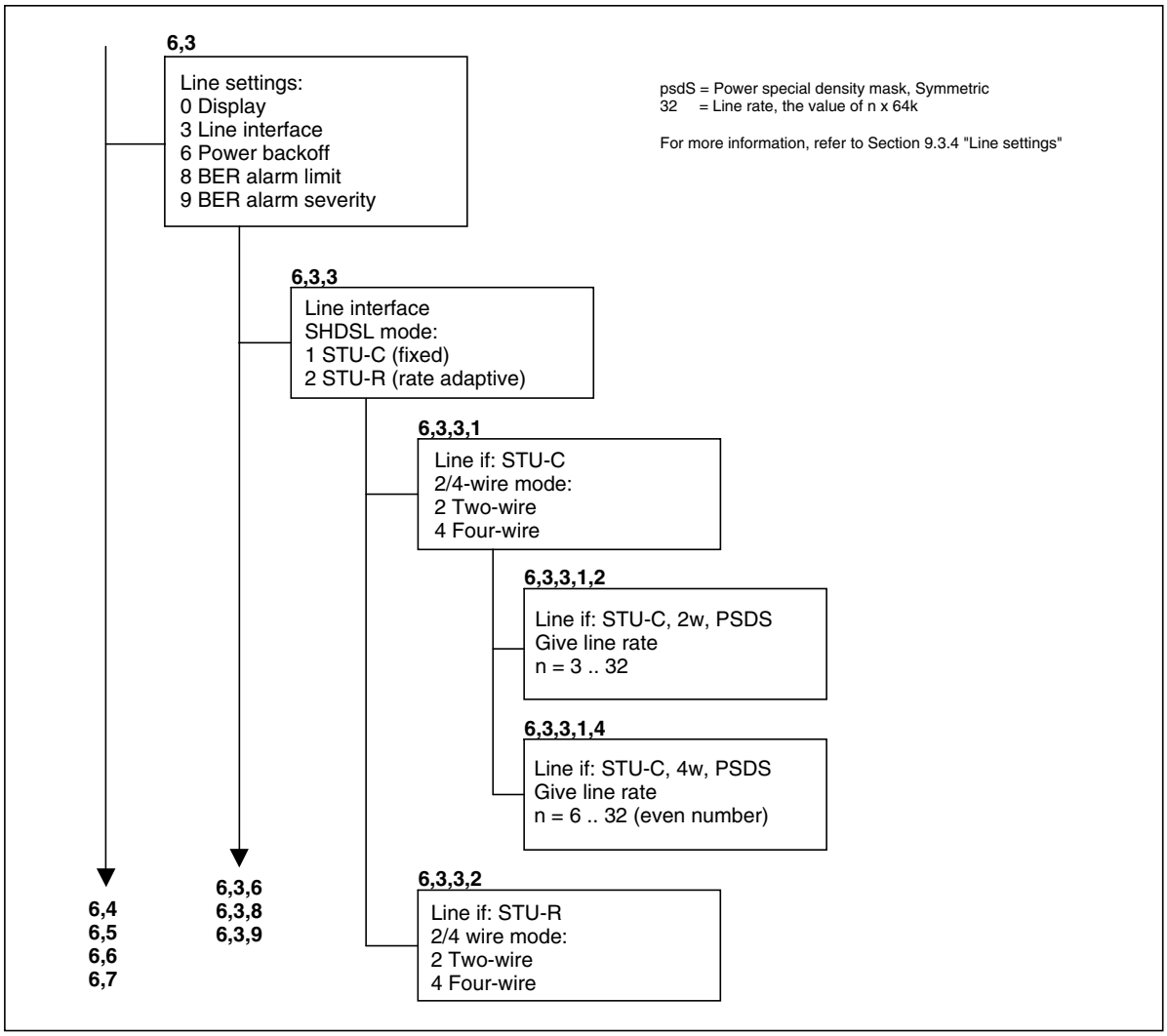


Figure 61. Settings menu structure (continued)

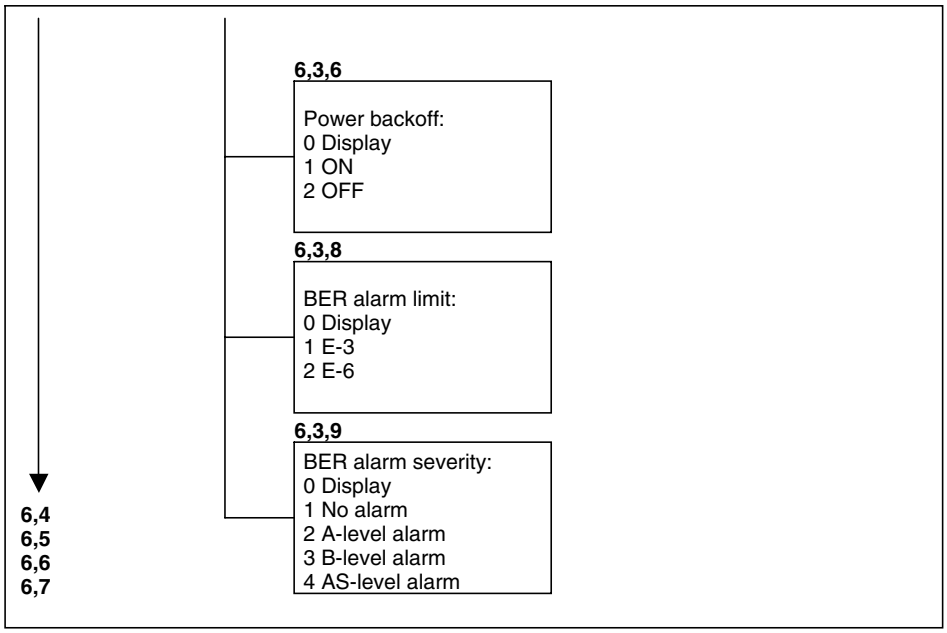


Figure 62. Settings menu structure (continued)

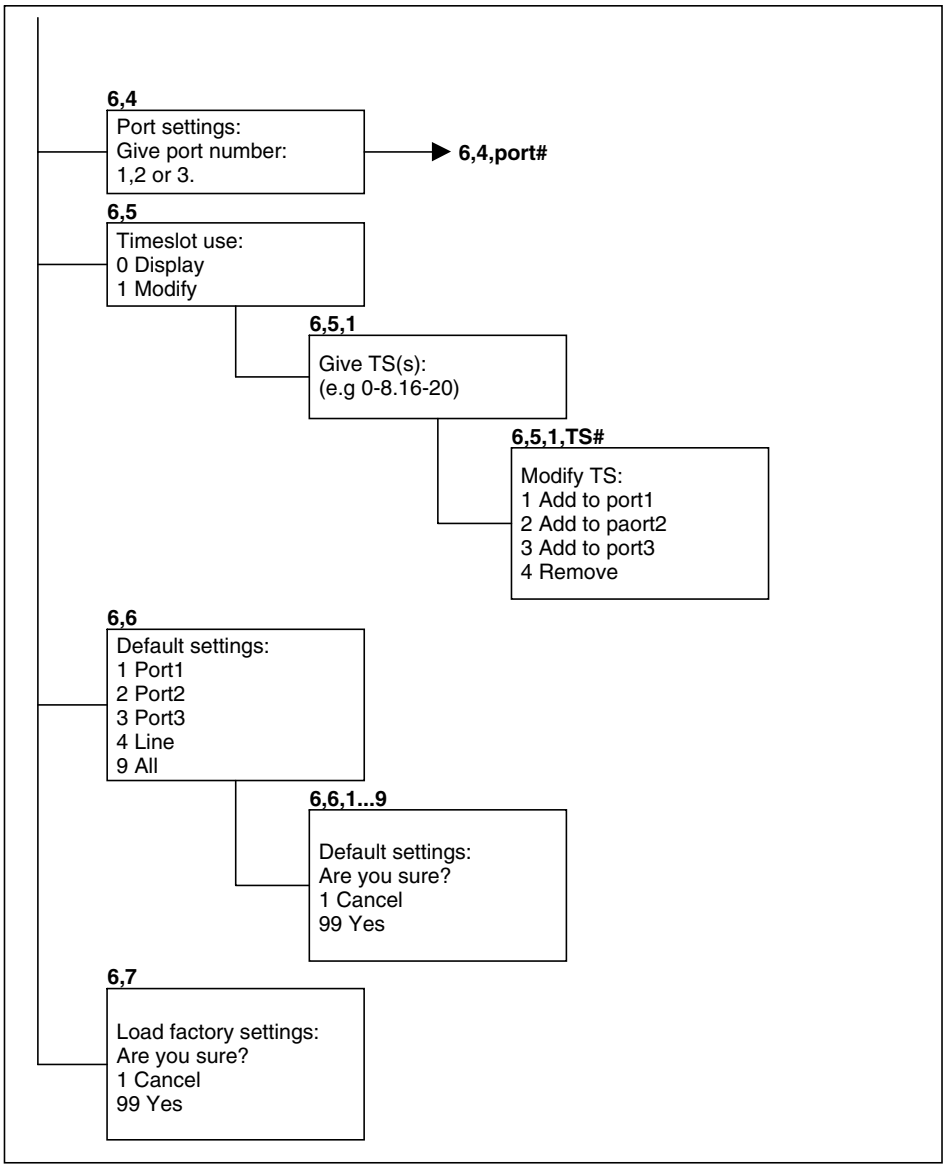


Figure 63. Settings menu structure (continued)

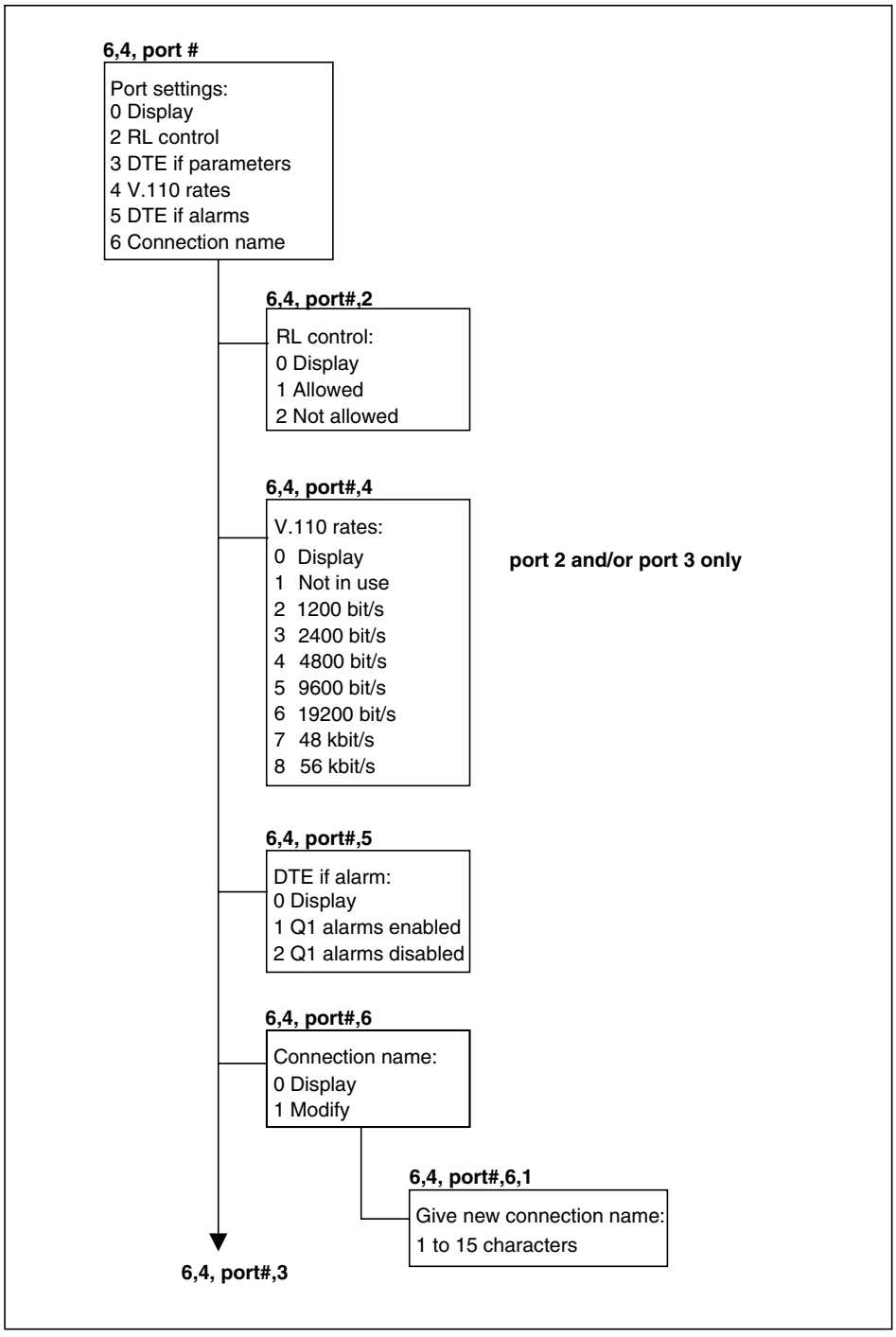


Figure 64. Settings menu structure (continued)

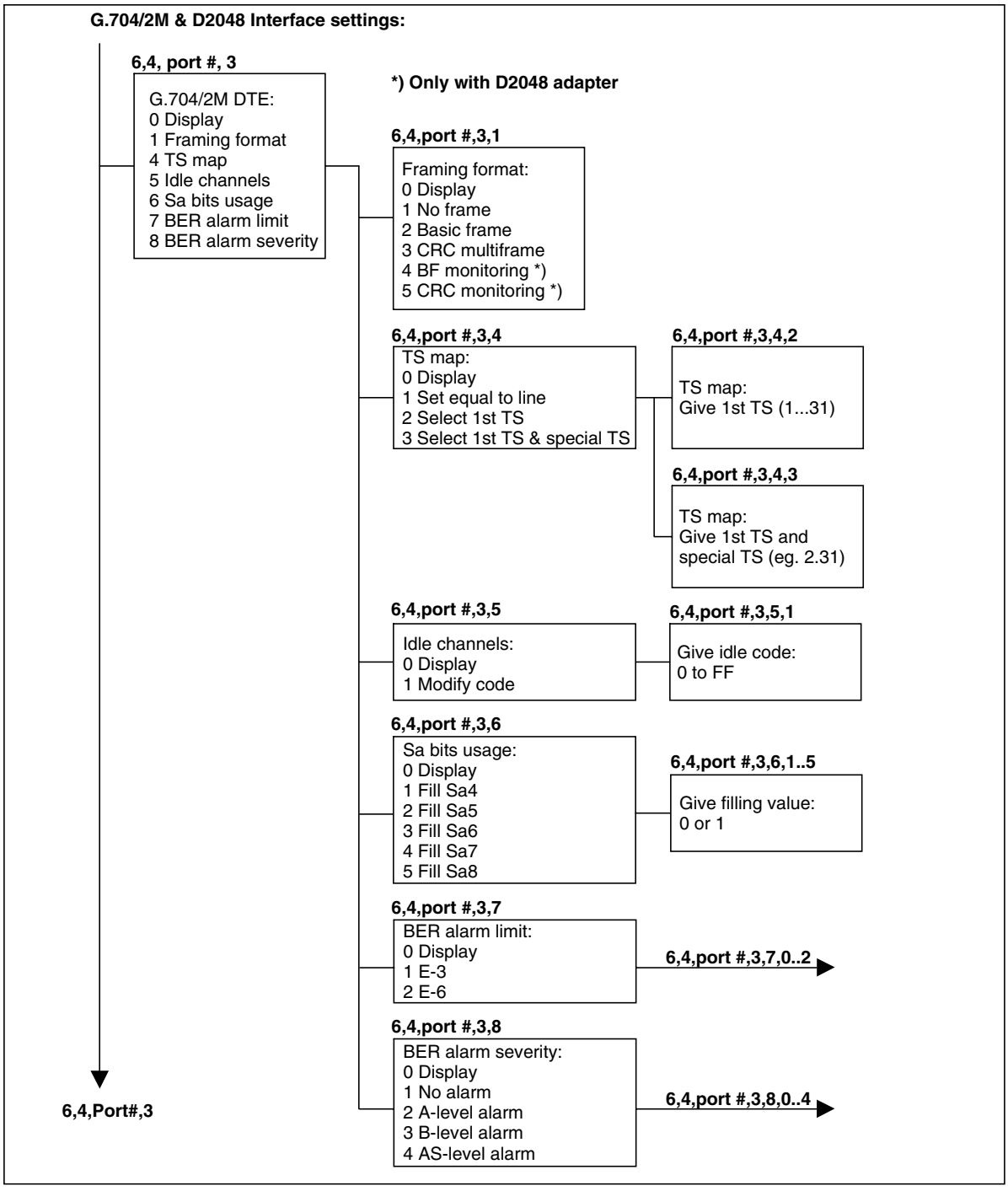


Figure 65. Settings menu structure (continued), G.704/2M & D2048 adapters

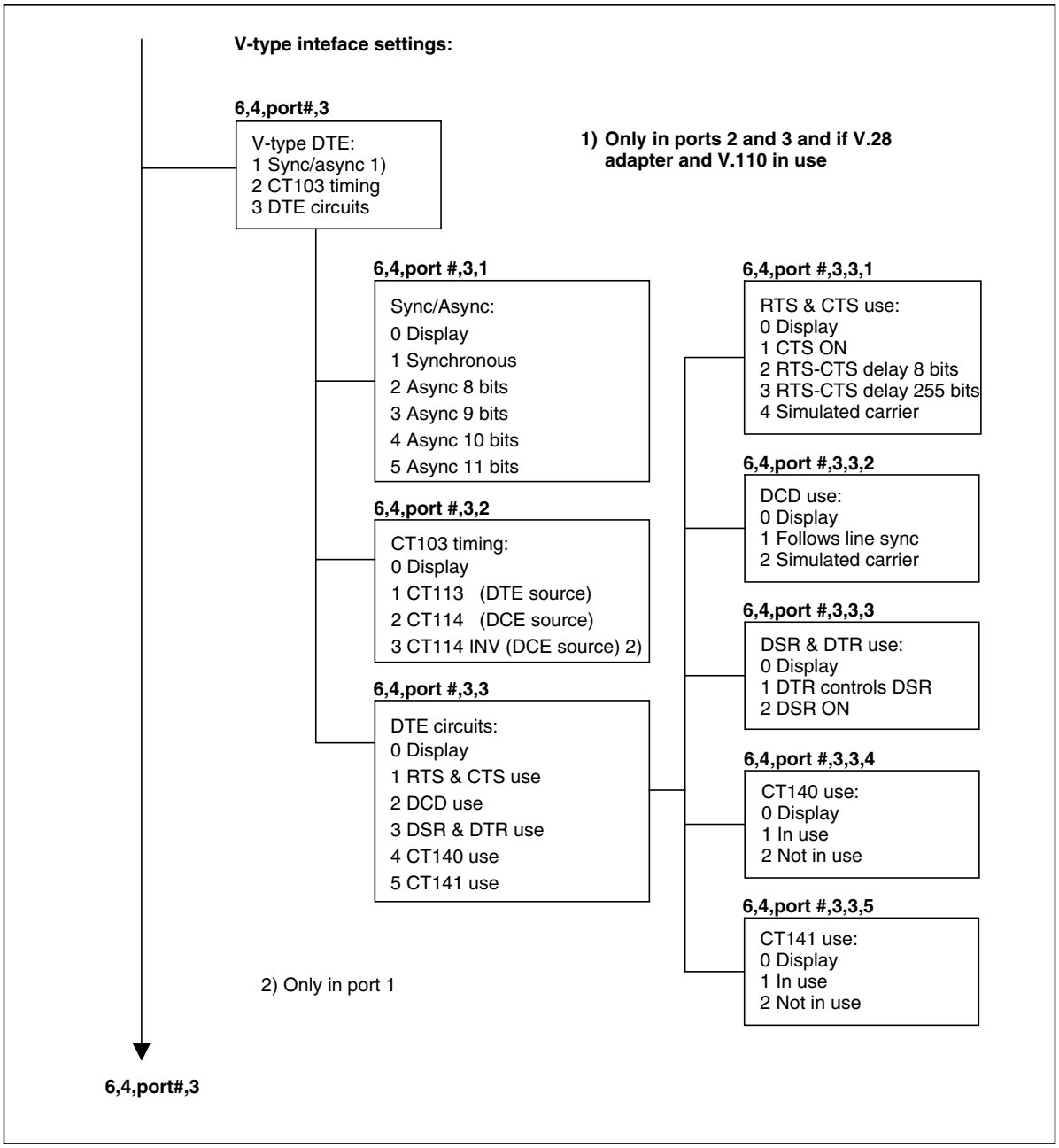


Figure 66. Settings menu structure (continued), V-type adapters

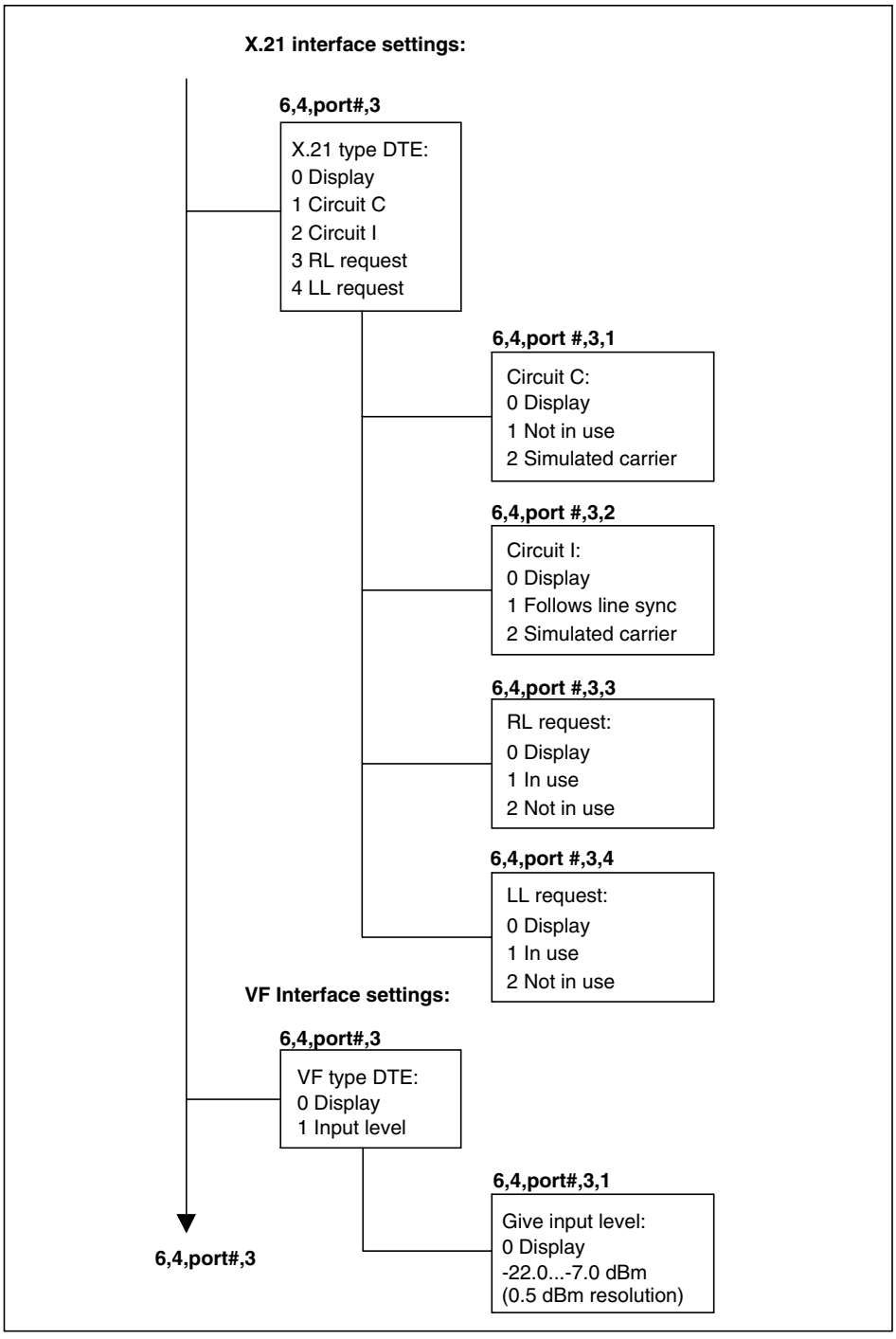


Figure 67. Settings menu structure (continued), X- and VF-type adapters

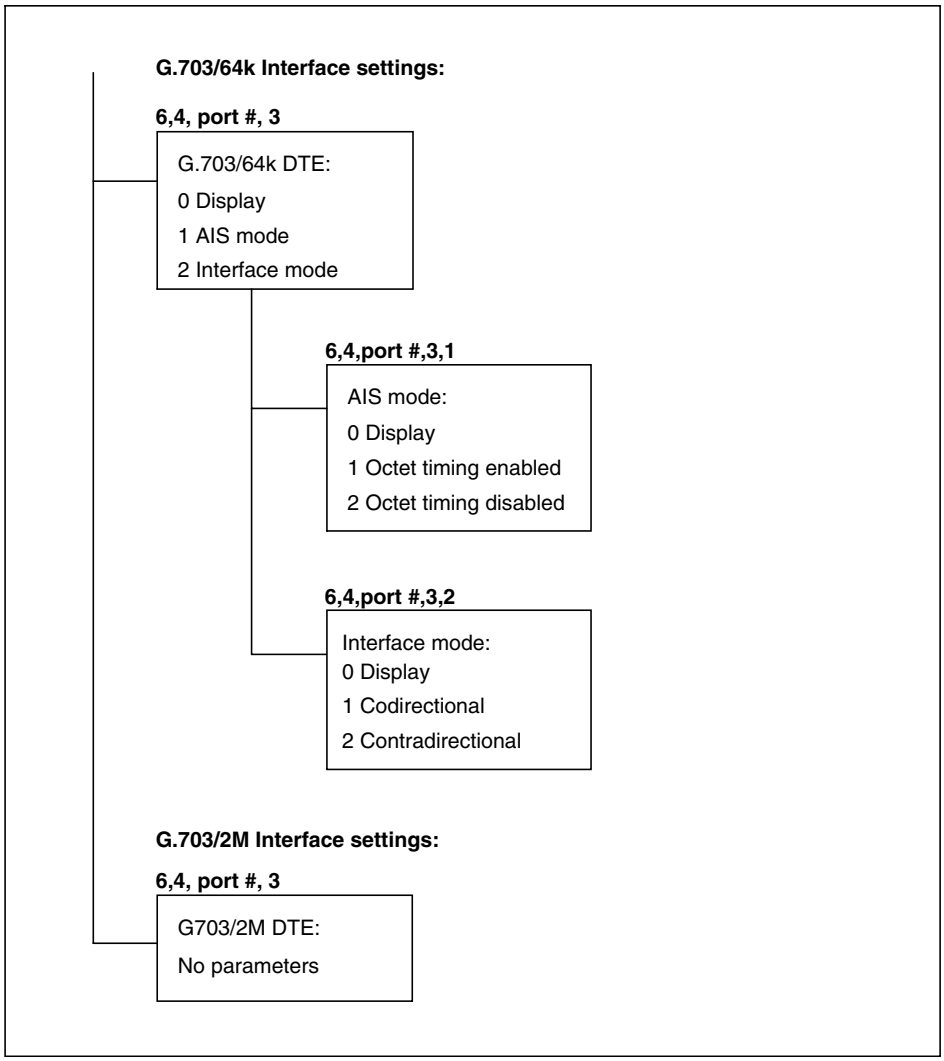


Figure 68. Settings menu structure (continued), G.703/64k & G.703/2M

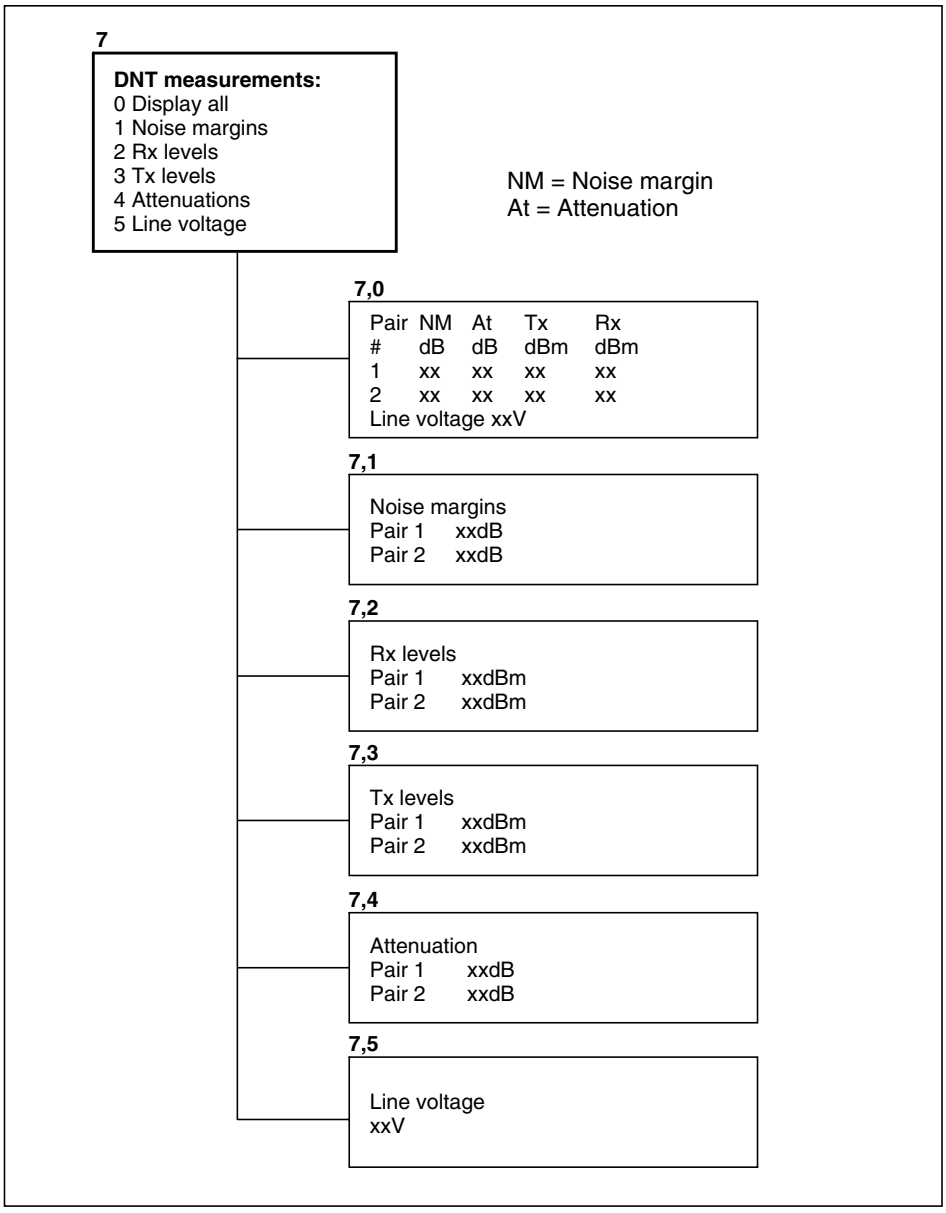


Figure 69. Measurements menu structure

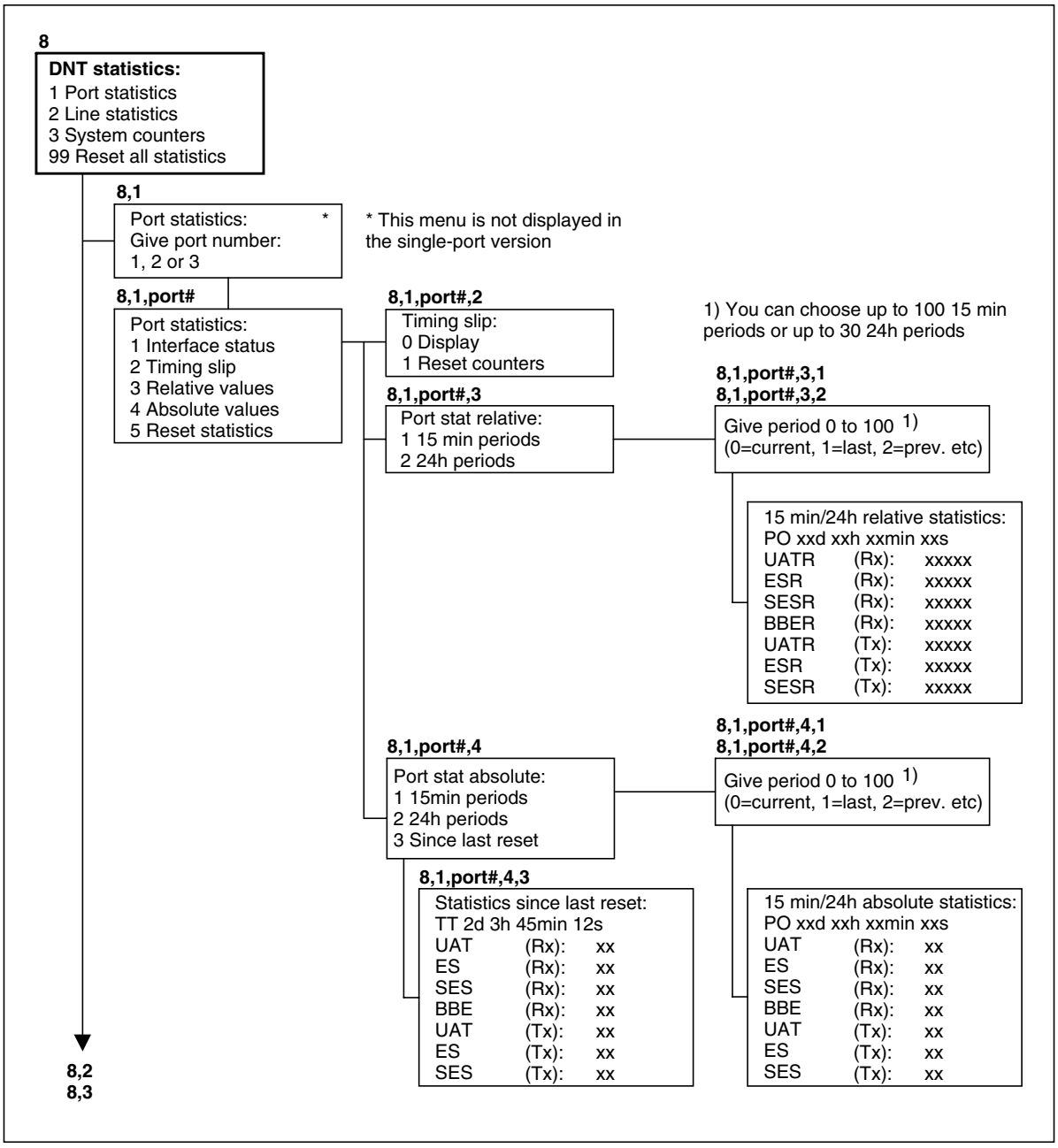


Figure 70. Statistics menu structure

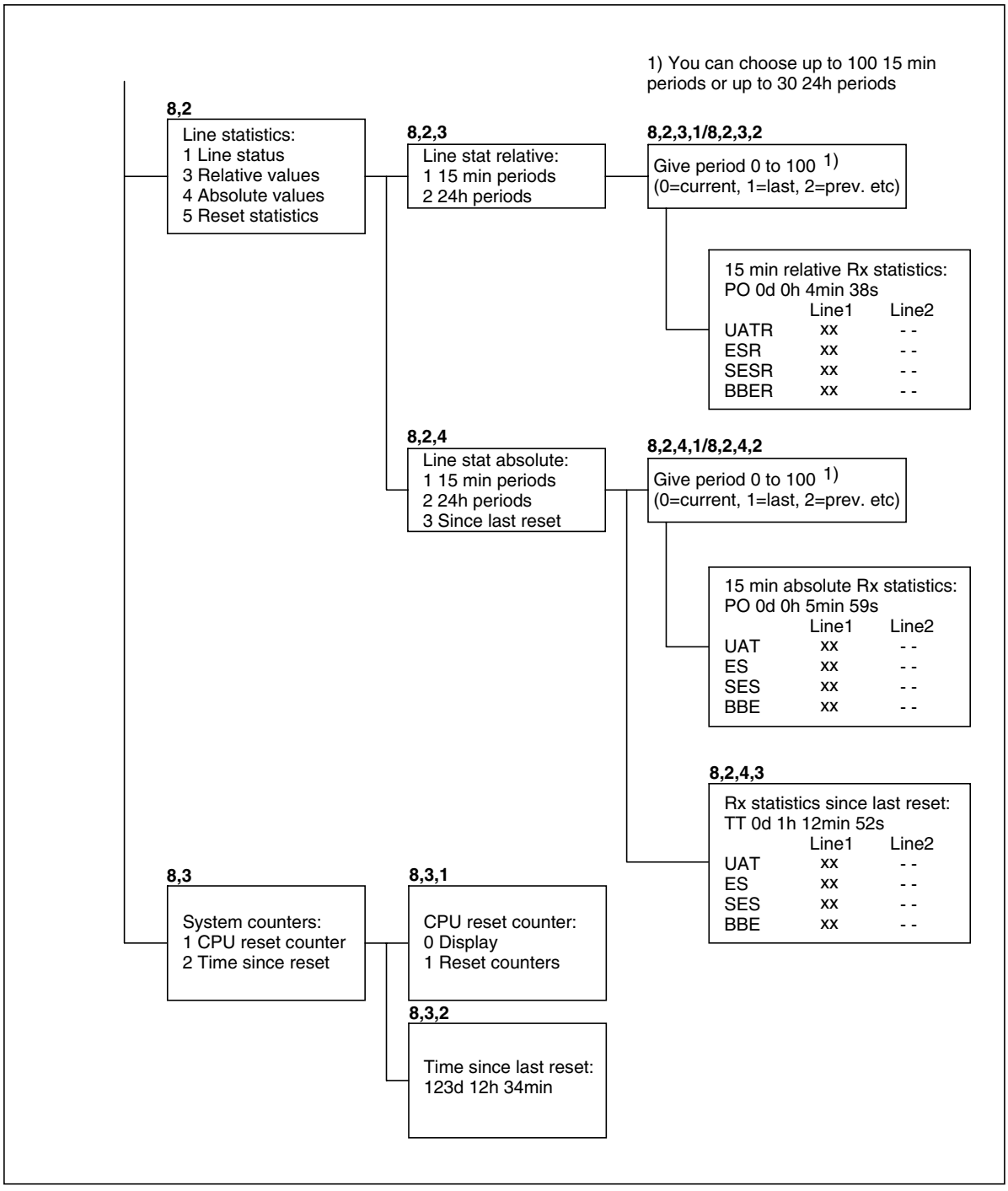


Figure 71. Statistics menu structure (continued)

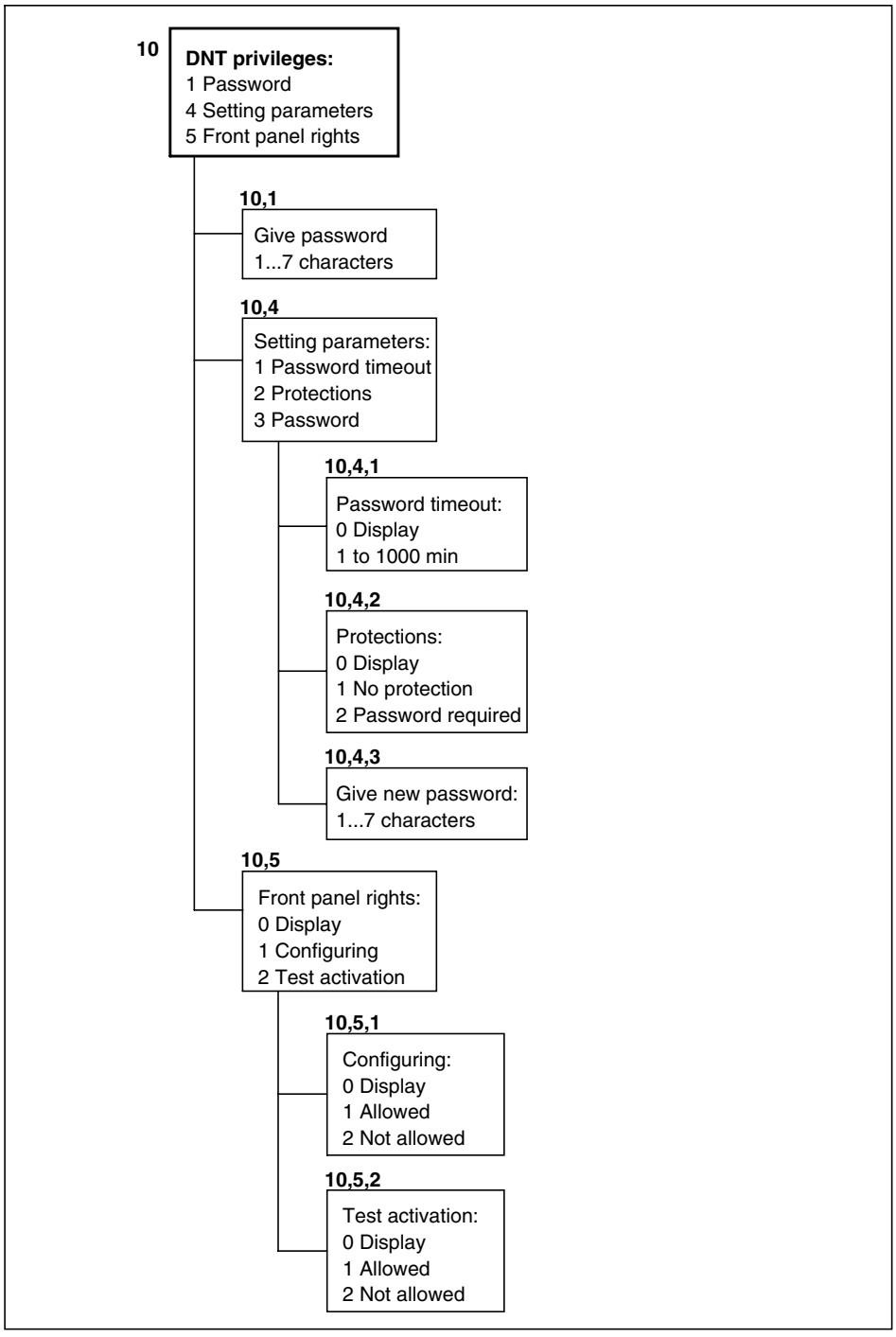


Figure 72. Privileges menu structure

9.2 DNT controls (5)

The **DNT controls** menu (see Figure 58) contains all possible tests to be activated in DNT2Mi via the Q1 management.

It also shows if DNT2Mi in question is being tested. See the example below.

```
Display controls:
        type            control
Port1:  --              --
Port2:  --              --
Port3:  --              --
Line:   G.704           --
```

The **DNT Controls** menu also has a **Self Test** submenu, which shows the result of the last self test and enables the activation of a self test. The activation of this test cuts off the connection between the network manager and the unit. The result of the self test can be read after the unit has performed the whole test. The test takes about 20 seconds.

Caution

The activation of a self test also cuts the data connection.

9.3 DNT settings (6)

9.3.1 Display (6,0)

The first display of the **DNT Settings** menu (see Figure 59) shows part of the current settings. The display can look, for example like this:

```
DNT settings:
Q1 speed:                4800
Q1 address:              2
Q1 via line:             Off
LM interface:            On
Test timeout limit:      10
Timing source:           Line
Line interface:
  STU-R rate adaptive
  2-wire
  PSD symmetric
  Line rate n=32 (2048k)
Power backoff:           On
BER alarm limit:         1E-3
BER alarm severity:      B-level
Port 1 (V.35) rate:      Line rate n=32 (2048k)
Port 2 (--) rate:        1*64 kbit/s
Port 3 (--) rate:        1*64 kbit/s
Timeslot usage:
TS:     Port:    TS:     Port:
00      P1       01      P1
02      P1       03      P1
04      P1       05      P1
06      P1       07      P1
08      P1       09      P1
10      P1       11      P1
12      P1       13      P1
14      P1       15      P1
16      P1       17      P1
18      P1       19      P1
20      P1       21      P1
22      P1       23      P1
24      P1       25      P1
26      P1       27      P1
28      P1       29      P1
30      P1       31      P1
```

9.3.2 Service options (6,1)

The **Service options** menu provides also the network manager with three Q1-specific configurable service options, that is, speed used on the management connection, Q1 address, and management path. All these options can be checked and changed.

Q1 speed (6,1,1)

The speed must be selected according to the speed used in the management network.

Q1 address (6,1,2)

The Q1 address must be selected before DNT2Mi can be accessed using management.

The address can range from 0000 to 4095. The last address (4095) is a universal address that cannot be selected by the Q1 manager.

Q1 management path (6,1,3)

A Q1 management source is selected from this menu. The source can either be:

- Q1 via line, EOC
- Local management interface
- Q1 via Port1 (only with G.704 adapter).

9.3.3 Timing source (6,2)

This menu allows you to select a source for timing. The timing alternatives are:

- Internal
- Line
- Port1
- Transparent.

Figure 73 illustrates the principle of each alternative.

The timing of circuit 103 can be set either by the clock from DTE (113) or by the clock of the equipment (114). See Figures 78 and 79 in Section 9.3.5.

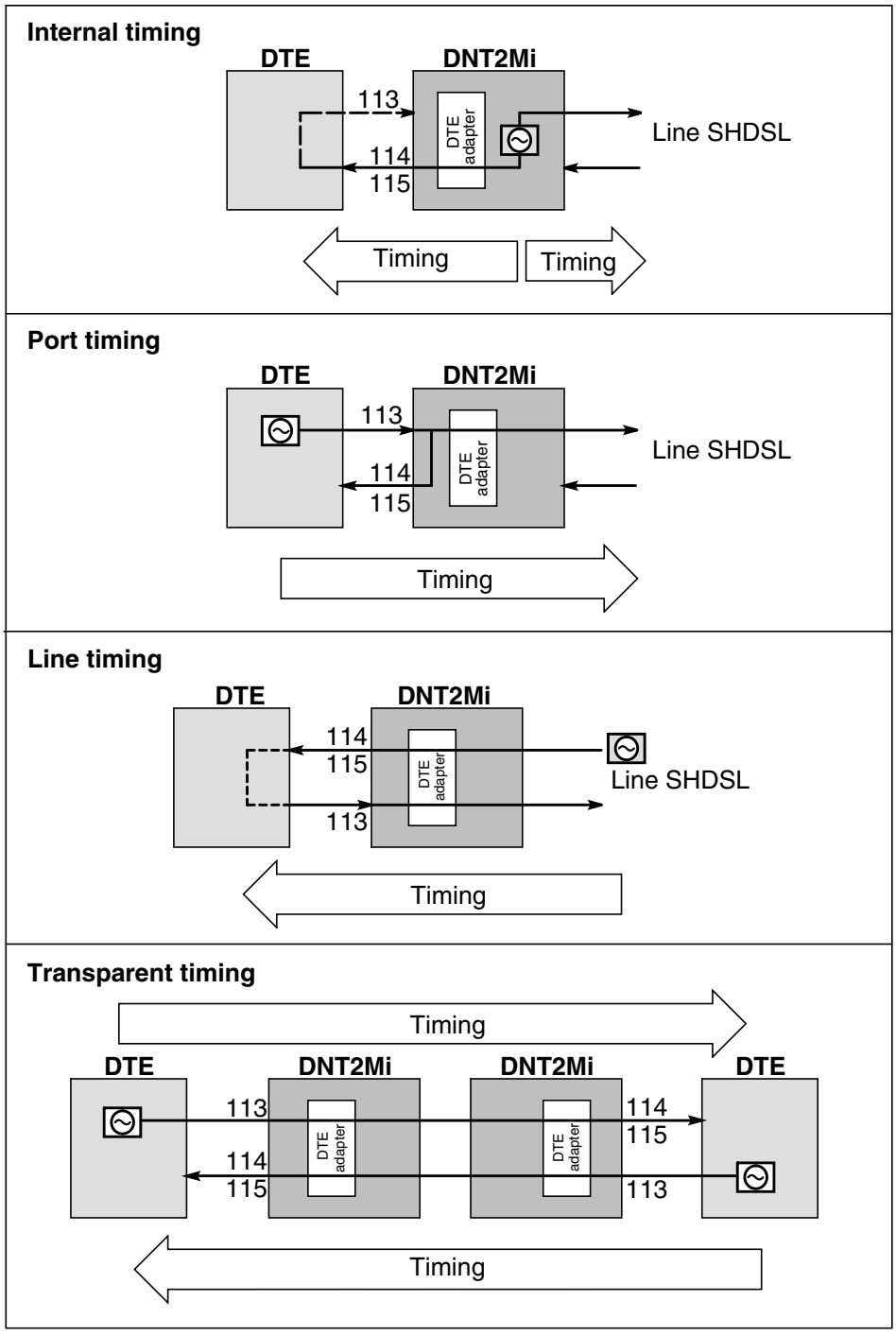


Figure 73. Timing source alternatives

9.3.4 Line settings (6,3)

This menu branch allows you to perform settings to a line.

Line interface (6,3,3)

In this menu, you can select the following line settings:

- SHDSL mode
- 2-wire or 4-wire mode
- Line rate.

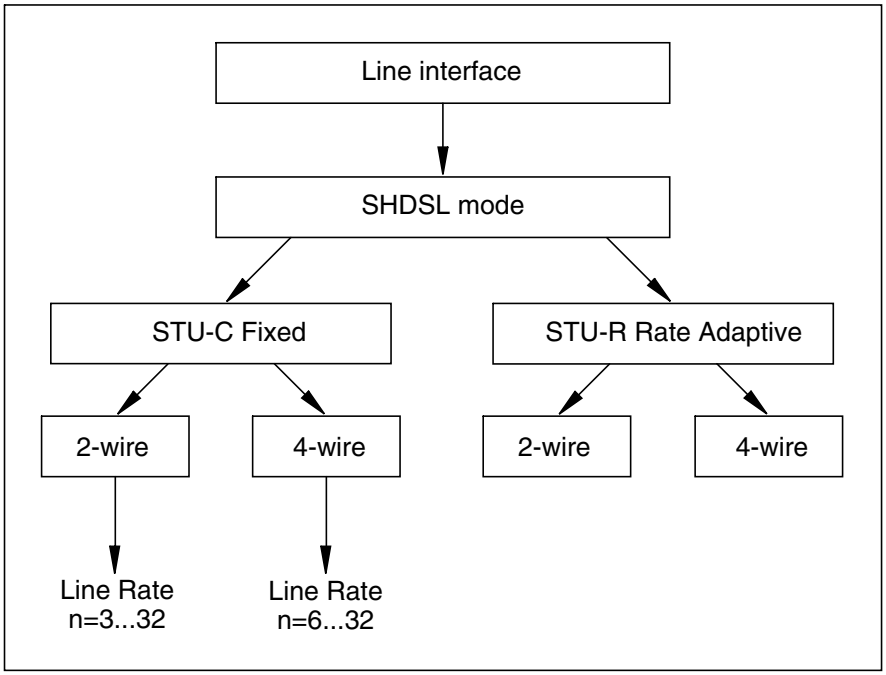


Figure 74. Principle of the Line interface menu

SHDSL mode (6,3,3)

This menu allows you to select the SHDSL mode.

- STU-C (6,3,3,1)

  This option defines the unit as a SHDSL Termination Unit (STU) Central office. It also sets the bit rate in the line as **Fixed**. STU-C determines line rate to the value given with the menu command **Give line rate (6,3,3,1,2,1)**.

- STU-R (6,3,3,2)

  This option defines the unit as a SHDSL Termination Unit (STU) Remote. It also sets the bit rate in the line as **Rate adaptive**. If the line conditions (attenuation/noise) allow, STU-R adapts to the line rate set on the STU-C side.

- Two-wire (6,3,3,1,2)

  In the **2-wire** option, only Line 1 is enabled. Line 2 is idle. See Figure 8 for line connector pins.

- Four-wire (6,3,3,1,4)

  In the **4-wire** option, both lines (Line 1 and Line 2) are enabled. See Figure 8 for line connector pins.

- PSD mask: Symmetric

  Symmetric PSD mask defines the spectral shape of the signal transmitted to the line. The symmetric PSD is in use for both 2- and 4-wire modes (G.991.2 Annex B).

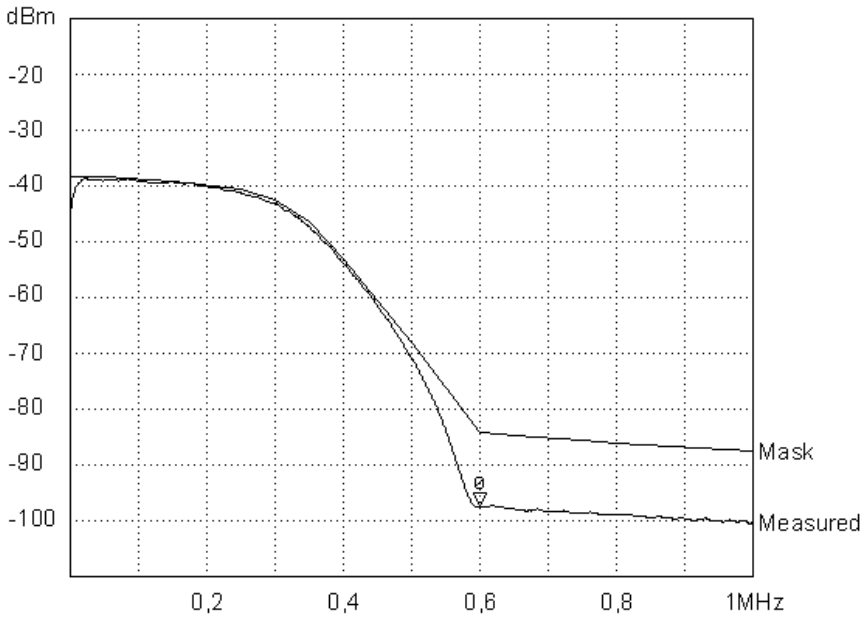


Figure 75. Measured SHDSL symmetric PSD and mask; 2-w, 2M

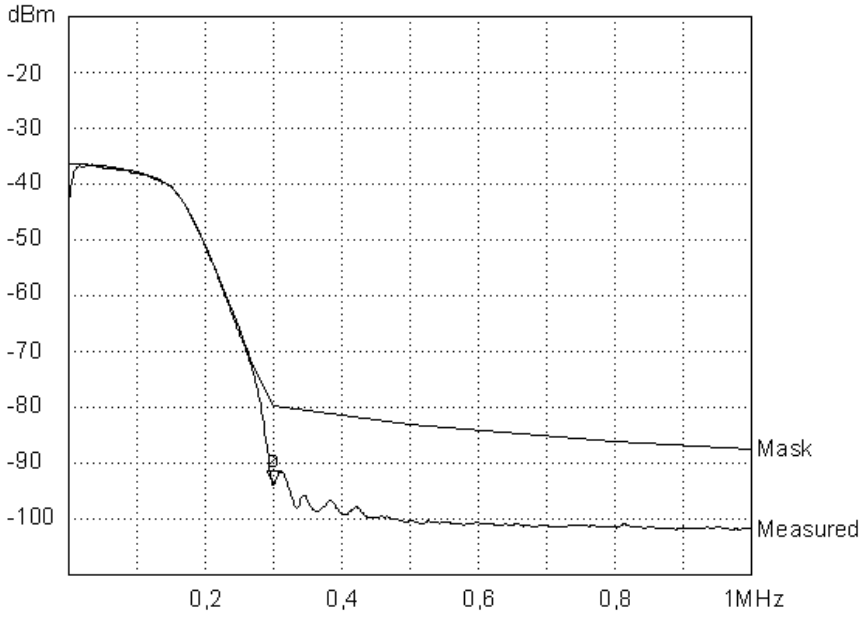


Figure 76. Measured SHDSL symmetric PSD and mask; 4-w, 2M or 2-w, 1M

- Give line rate (6,3,3,1,2,n; 6,3,3,1,4,n)

  This setting defines the maximum achievable bit rate in the line only if the STU-C option is taken into use.

  In the **4-wire** mode, only even numbers for **n** are allowed (n = 6, 8, 10...32).

Power backoff (6,3,6)

- ON (6,3,6,1)

  Select this option to enable transmit power reduction on short loops. The transmit power is reduced as a function of the line power loss shown in Table 16.

Table 16. Function of the line power loss

Power loss (dB)	Power backoff (dB)
PL > 6	0
6 ≥ PL > 5	1
5 ≥ PL > 4	2
4 ≥ PL > 3	3
3 ≥ PL > 2	4
2 ≥ PL > 1	5
1 ≥ PL > 0	6

- OFF (6,3,6,2)

  Select this option to disable transmit power reduction.

Line length

The maximal performance shown in Figure 77 is measured in ideal circumstances with the VMOHBU 0.4 mm cable. In a real case, you should reserve 3-6 dB noise margin due to changing circumstances in the line.

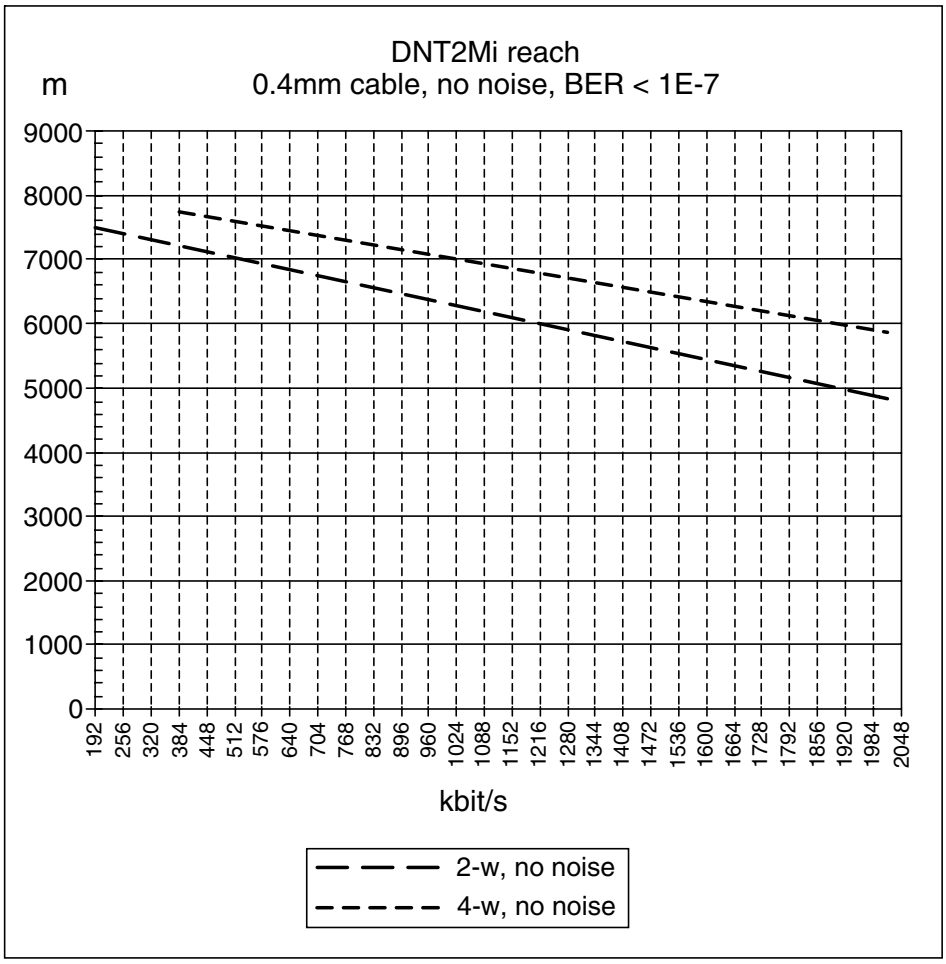


Figure 77. Maximal cable length

Factors limiting connection length

The maximum connection length of DNT2Mi is defined by the following variables:

- Cable attenuation

  The attenuation of a cable depends on thickness and pair capacitance. It also depends on impedance mismatching, resulting from connecting different types of cables, as well as from the reflections caused by this.

- Cable noise level

  Noise in a cable is mainly caused by cross talk between wire pairs. The main sources of noise are units using the same frequency band.

- Cable impulse noise level

  Impulse noise in a cable can be caused, for example, by a telephone's pulse dialling signals and exchanges based on relay technique.

- Cable distortion

  DNT2Mi has an effective adapter equalizer, which corrects the distortion caused by the cable. However, if the connection is extremely long, the extent of the distortion may also restrict the length.

- Remote power feeding

  If a 110 V remote power is used, the maximum line length may be limited. If a 145 V supply voltage is used, remote power feeding does not limit the maximum cable length. However, the use of a 145 V supply voltage may be restricted due to local safety regulations.

BER alarm limit (6,3,8)

The bit error rate (BER) alarm limit can be either 10^{-3} (E-3) or 10^{-6} (E-6).

BER alarm severity (6,3,9)

The severity of a line BER alarm can be viewed and changed through this menu.

9.3.5 Port settings (6,4, port #)

This menu (see Figure 64) allows you to select any of the three ports and to configure its settings.

The selection of menu parameters depends on the type of the adapter used. The adapter's type is detected automatically and different displays are shown for each type.

The first display (**6,4, port #,0**) of the **Port Settings** menu shows the following information:

```
Port 1:
Status:       Active
Type:         V.11
Rate:         31*64 kbit/s
Mode:         Synchronous
Conn. name:   PORT x
```

Remote loop (RL) control (6,4, port #,2)

The RL control is available when a V.11, V.28, V.35, X.21, G.704/2M, G.703, or EIA-530-A adapter is installed in the port.

This setting can allow the port to react to a RL request (ITU-T V.54) incoming from the line or prevent this to happen. If the RL control is allowed, a digital loop (loop to line) is established in the port if a request has been detected from the incoming data.

V-type interface settings (6,4, port #,3)

- Synchronous or asynchronous (6,4, port #,3,1)

  The asynchronous or synchronous conversion according to ITU-T V.14. is possible using the V.28 adapter in multiport versions in port 2 or 3. The conversion is available when bit rates 1200, 2400, 4800, 9600, and 19200 bit/s are used. No other adapter can be used for this purpose.

  This option allows you to use the asynchronous character length. The bit number includes start, data, and stop bits (8 bits: 1 start + 6 data + 1 stop).

- CT103 timing (6,4, port #,3,2)

  The timing of the data coming from DTE can be selected either by circuit 113 (external, coming from DTE) or circuit 114 (internal generated by the DNT port), see Figures 78 and 79.

  This suboption, which does not force DNT2Mi to synchronise to an external clock source, allows you to select a clock to be used to get data into the DNT port.

  The synchronisation of the equipment is described in Section 9.3.3.

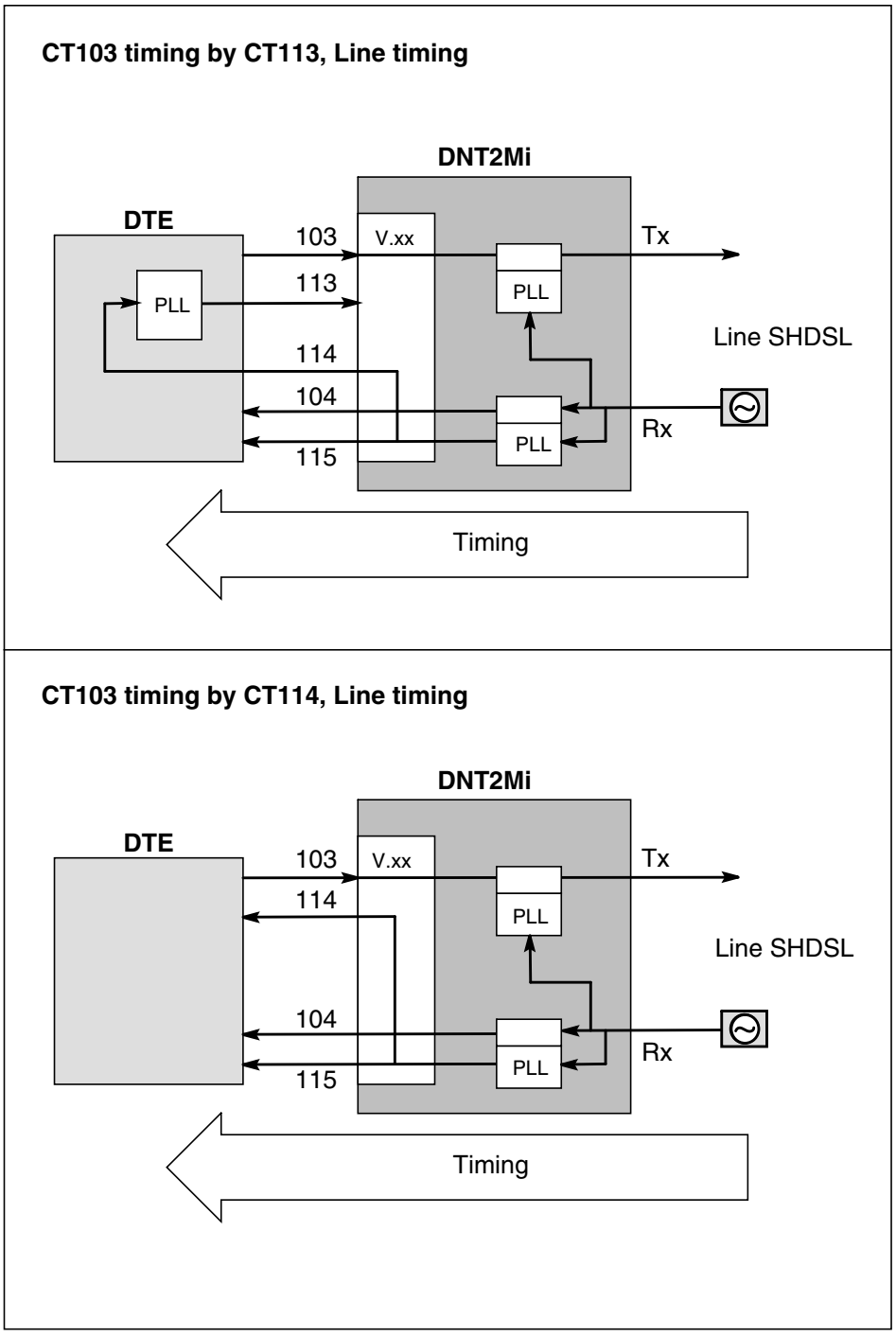


Figure 78. CT103 timing alternatives, line timing

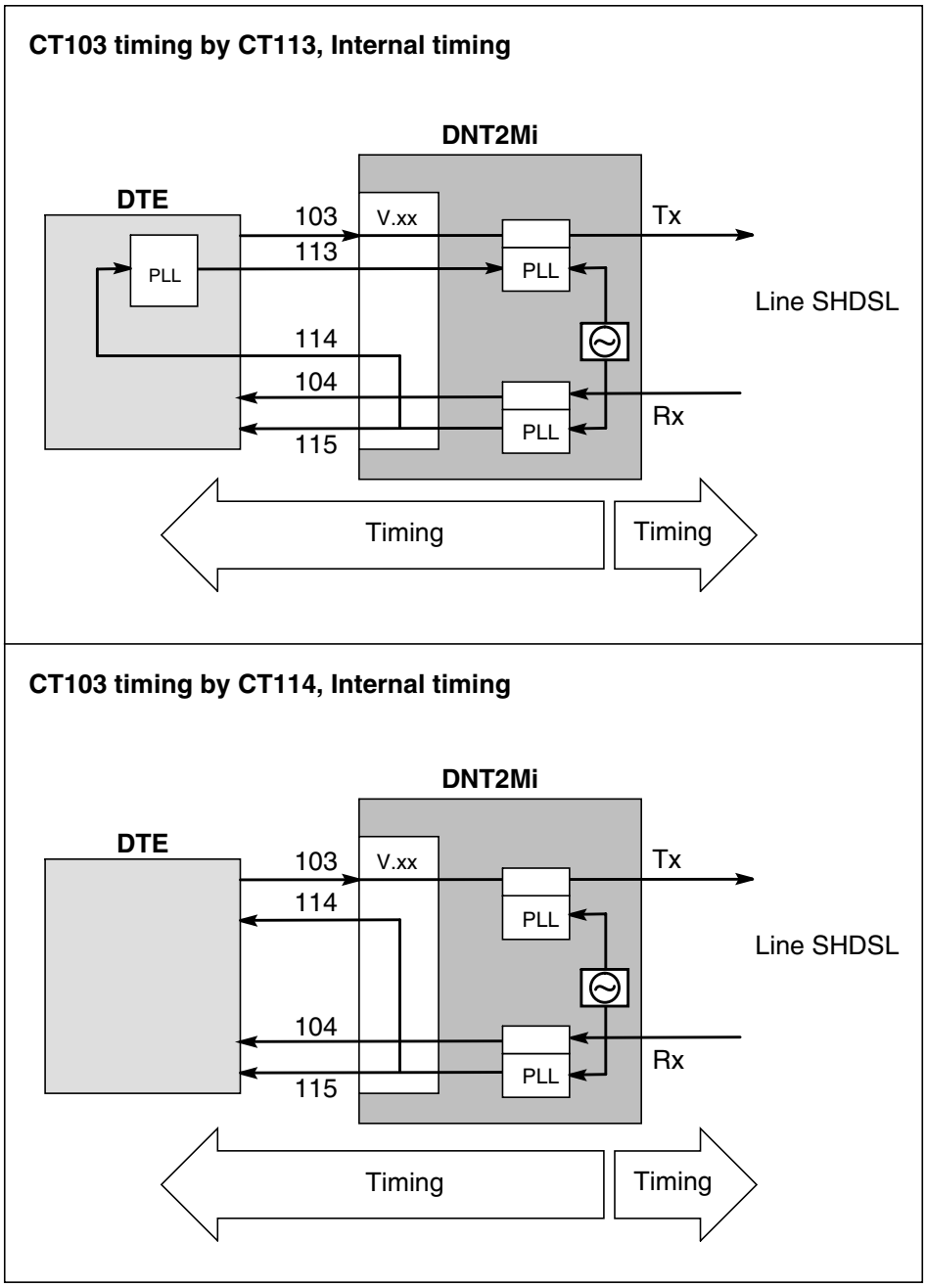


Figure 79. CT103 timing alternatives, internal timing

- DTE circuits (6,4, port #,3,3)

  The contents of the **DTE circuits** menu depend on the type of the interface unit installed in the port. If no interface has been connected, the default is of V-type.

- CTS use (**6,4, port #,3,3,1**)

  The suboptions of the menu allow you to:
  - display the current use of the circuits
  - set the CTS (106) circuit ON
  - make the CTS circuit follow the RTS (105) circuit with a 8-bit delay in transition from the OFF state to the ON state
  - make the CTS circuit follow the RTS circuit with a 255-bit delay in transition from the OFF state to the ON state
  - set the RTS circuit to control the DCD (109) circuit at the remote end (**Simulated carrier**).
- DCD use (**6,4, port #,3,3,2**)

  The suboptions of the menu allow you to:
  - display the use of the DCD circuit
  - set the DCD circuit to follow the synchronisation of the line (frame sync on –> DCD on)
  - set the DCD circuit to follow the simulated carrier signal (V.13).
- DSR & DTR use (**6,4, port #,3,3,3**)

  The suboptions of the menu allow you to:
  - display the current use of the DSR (107) and DTR (108) circuits
  - set the DSR circuit to follow the state of the DTR circuit
  - set the DSR circuit to ON state, the DTR circuit not being in use.
- CT140 use (**6,4, port #,3,3,4**)

  The suboptions of the menu allow you to:
  - display the current use of circuit 140
  - enable or disable circuit 140 to control the remote loop to line.
- CT141 use (**6,4, port #,3,3,5**)

  The suboptions of this menu allow you to:
  - display the current use of circuit 141
  - enable or disable circuit 141 to control the local loop.

G.704/2M-type interface settings (6,4, port #,3)

- Framing format (6,4, port #,3,1)

  The use of the G.704 framing can be selected or its use can be prevented using this menu (see Figure 65). The selections are:

  - No frame
  - Basic frame
  - CRC multiframe

- BF monitoring (only with the D2048-type adapters)
- CRC monitoring (only with the D2048-type adapters).

Note

The collection of statistics data is not possible in the ’No frame’ mode.

• TS mapping (6,4, port #,3,4)

The placement of time slots to a G.704 frame can be set via this menu. There are two placement alternatives: either in the same way as in the line side or starting from a user given time slot, see the example in Figure 80.

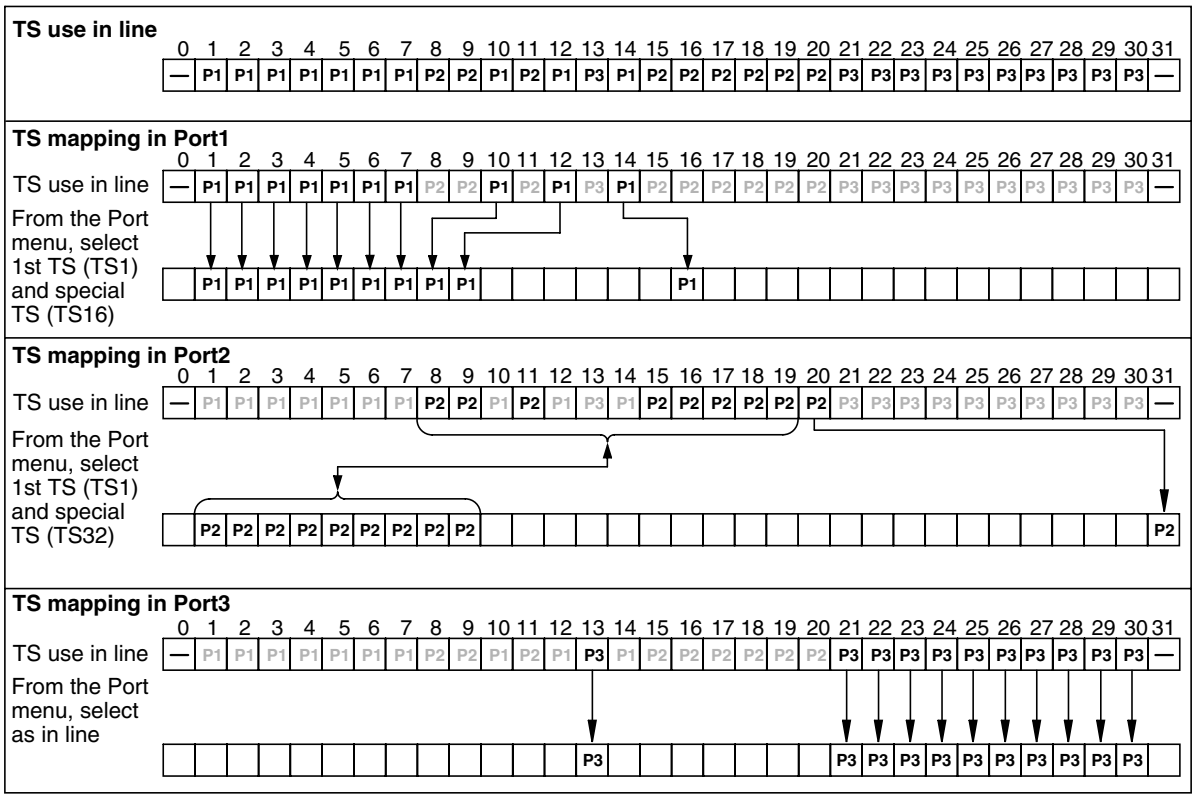


Figure 80. Time slot mapping example, TS0 locally terminated

- BER alarm limit (6,4, port #,3,7)

  The bit error rate (BER) alarm limit of the G.704/2M port can be checked and changed using this menu. The BER alarm limit can be either 10^{-3} (E-3) or 10^{-6}(E-6). Alarms can only appear if the frame format is either one of the CRC-4 alternatives.

- BER alarm severity (6,4, port #,3,8)

  This menu allows you to view and change the value set to the BER alarm severity. Alarms can only appear if the frame format is either one of the CRC-4 alternatives.

X.21-type interface settings (6,4, port #,3)

The X.21 adapter is installed in the port.

The menu (see Figure 67) allows you to check the current states of DTE circuits and possible changes occurred during the last 15 minutes.

- Circuit C (6,4, port #,3,1)

  The options of the submenu are:

  - to display the use of circuit C
  - not to use circuit C (**Not in use**)
  - to select circuit C to control circuit I at the remote end by using ITU-T V.13 signalling (**Simulated carrier**).
  - Circuit I (6,4, port #,3,2)
    There are two optional alternatives:
    - to make circuit I follow the state of line synchronisation.
    - to set circuit I to follow simulated carrier signalling (V.13).

G.703/64k-type interface settings (6,4, port #,3)

- Interface mode (6,4, port #,3,2)

  The interface mode can be codirectional or contradirectional (see Figure 68). In the contradirectional mode, you need to select the internal timing source.

DTE interface (if) alarm (6,4, port #,5)

The Q1 DTE alarm handling can be enabled or disabled (see Figure 64). If it is enabled, all DTE alarms of the port in question are transmitted to Q1 management. If the option **Q1 alarms disabled** is selected, DTE alarms are not forwarded to Q1 management.

9.3.6 Time slot use (6,5)

The mapping of time slots can be viewed and configured via this menu (see Figure 63).

The format of the display showing the current use of the time slots is as follows:

- Time slots can be freely selected between the ports.
- Time slots can be reserved only if they are not in use. Otherwise, they must be first removed from the time slot map.

Mapping is performed between the line and ports, that is, you can reserve time slots required for each port from the line, and the number of time slots defines the speed used at the port (see Figure 80, TS use in line). Time slots can be reorganised using the G.704 adapter (see Figure 80, TS mapping in Port 1-3).

9.3.7 Default settings (6,6)

The default settings are stored in the EEPROM. When installing DNT2Mi, the settings can be changed using the front panel menus or Q1 management (see Figure 63). Refer to Section 6.9 for the default values.

The default settings can be set separately to each DNT2Mi port and line. Selecting the option **9** (**All**) returns all default settings into use except for service options, that is, the Q1 speed and address.

To activate the settings, you have to answer **99** (**Yes**) after receiving a request for confirmation. It takes about 60 seconds to save the information. If the power is switched off during this time, factory settings will be written into the EEPROM. During the saving process, you can use the equipment normally.

If you answer **1** (**Cancel**), the default settings will not be taken into use.

9.3.8 Factory settings (6,7)

Factory settings can be loaded by using this menu (see Figure 63).

With this setting, it is possible to reset the EEPROM and to restore default structures and settings into use. Refer to Sections 6.9 and 6.10 for the default and factory values.

To activate the settings, you have to answer **99** (**Yes**) after receiving a request for confirmation. It takes about 60 seconds to save the information.

If you answer **1** (**Cancel**), the factory settings will not be taken into use.

9.4 Statistics (8)

This menu provides information on port, line, and system statistics.

Port statistics (8,1)

The **Port statistics** submenu (see Figure 70) allows you first to choose the number of the port.

Line statistics (8,2 and 8,3)

The **Line statistics** submenu (see Fig. 70) allows you to monitor the signal quality.

In the **Port/Line statistics** submenu:

- You must first select whether you want to monitor port or line statistics. Then select absolute or relative values. After this, you can define which period you want to monitor. The number of selectable periods can vary from 0 to 100, 0 standing for the current period, 1 for the last period, and 2 for the previous one, etc.
- You can choose between 0 to 100 periods of 15 minutes, or 0 to 30 periods of 24 hours to monitor a number of signal quality parameters according to G.826. For more information on statistic parameters of the line signal display, refer to Section 7.4. The format of the display is as follows:

```
15 min signal quality:
Period 1 (0 d 0 h 21 min)
UATR  (Rx):     xx
ESR   (Rx):     xx
SESR  (Rx):     xx
BBER  (Rx):     xx
UATR  (Tx):     xx
ESR   (Tx):     xx
SESR  (Tx):     xx
```

- You can view the values of the statistic parameters monitored since the last reset. See the example below.

Since last reset:	
TT:	0 d 0 h 26 min 1 s
UAT (Rx):	xx
ES (Rx):	xx
SES (Rx):	xx
BBE (Rx):	xx
UAT (Tx):	xx
ES (Tx):	xx
SES (Tx):	xx

- You can clear all statistic parameters.

9.5 User privileges (10)

This menu allows you to give a new password (see Figure 72). The length of the password can be 1 to 7 characters.

The default password is: DNT2Mi.

The menu allows also to restrict user rights by changing the settings of the parameters. The suboptions of the **Setting parameters** (**10,4**) menu allow you to:

- change the password timeout and display the current timeout value
- display the current status of protection and change the status
- change the password.

It is also possible to see whether the user is allowed or disallowed to configure the device or to launch tests using the front panel keys. The options of this submenu (**10,5**) give you possibility to:

- see if configuring or test launching (activation) is allowed or not
- allow or disallow users to configure or test DNT2Mi.

10 Technical specifications

10.1 Dimensions

Table 17. DNT2Mi multiport dimensions

Width	293.5 mm
Height	91.4 mm
Depth	236.8 mm
Weight	2.6 kg

Table 18. DNT2Mi single-port dimensions

Width	293.5 mm
Height	55 mm
Depth	236.8 mm
Weight	2.0 kg

10.2 Power supply

Table 19. DNT2Mi power supply

Power consumption, depending on adapters and power supply used (AC, DC, RP)	
DNT2Mi multiport	5 – 15.5 W • 5 W, when one G.703/2M adapter, remote power supply and 2-wire line used • 12 W, when three V.35 adapters, AC power supply and 2-wire line used • 15.5 W, when three ET adapters, AC power supply and 4-wire line used
DNT2Mi single-port	4.4 – 10.5 W • 4.4 W, when G.703/2M adapter, remote power supply and 2-wire line used • 7.3 W, when V.35 adapter, AC power supply and 2-wire line used • 10.5 W, when ET adapter, AC power supply and 4-wire line used
AC power supply	
Voltage	90 to 264 V_{AC}
Frequency	47 to 65 Hz
Tolerance against interruptions	> 40 ms at 90 V
	> 500 ms at 230 V
DC power supply	
Voltage	-20 to -75 V
Remote power supply	
Voltage	50 to 150 V on both pairs as generated through ACL2i at central site
Start-up voltage	Min. 90 V_{DC}

10.3 Line interfaces

Table 20. Line interface 192 kbit/s to 2048 kbit/s (in accordance with ITU-T G.991.2 Recommendation)

Line code	16-TCPAM
Line rate 2-w (payload)	192 to 2048 kbit/s
Line rate 4-w (payload)	384 to 2048 kbit/s

DTE interfaces

Supported interchangeable DTE interface types:

- V.11
- V.28
- V.35
- X.21
- G.703/64k
- D2048
- ET interface
- G.703/2M
- G.704/2M
- EIA-530-A
- VF

10.4 Unit identification

The equipment can be identified by viewing the sticker located in the bottom corner of the unit, see Figure 81. The sticker includes two codes. The upper code includes the unit's manufacturing details. For example, the manufacturing time (year and week) is indicated after the two first digits – "0201" in the example sticker.

The lower code ("T65670.01....0" in the example) indicates the unit's product code.

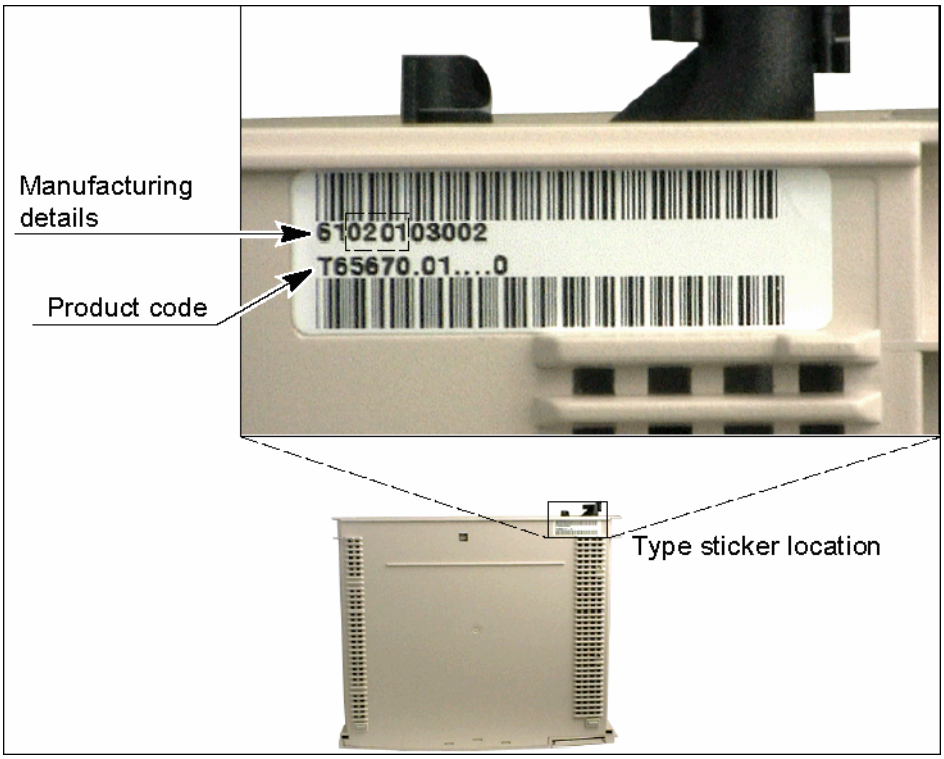


Figure 81. Example of DNT2Mi identification sticker

10.5 Ambient conditions

10.5.1 Environmental and mechanical requirements

The climatic and mechanical requirements of DNT2Mi comply with the following ETSI specifications:

Table 21. Environmental and mechanical requirements

Transportation	ETSI ETS 300 019-2-2 class 2.3
Storage	ETSI ETS 300 019-2-1 class 1.2
Operation	ETSI ETS 300 019-2-3 class 3.2

Figure 82 describes in more detail the recommended conditions for the use of the device.

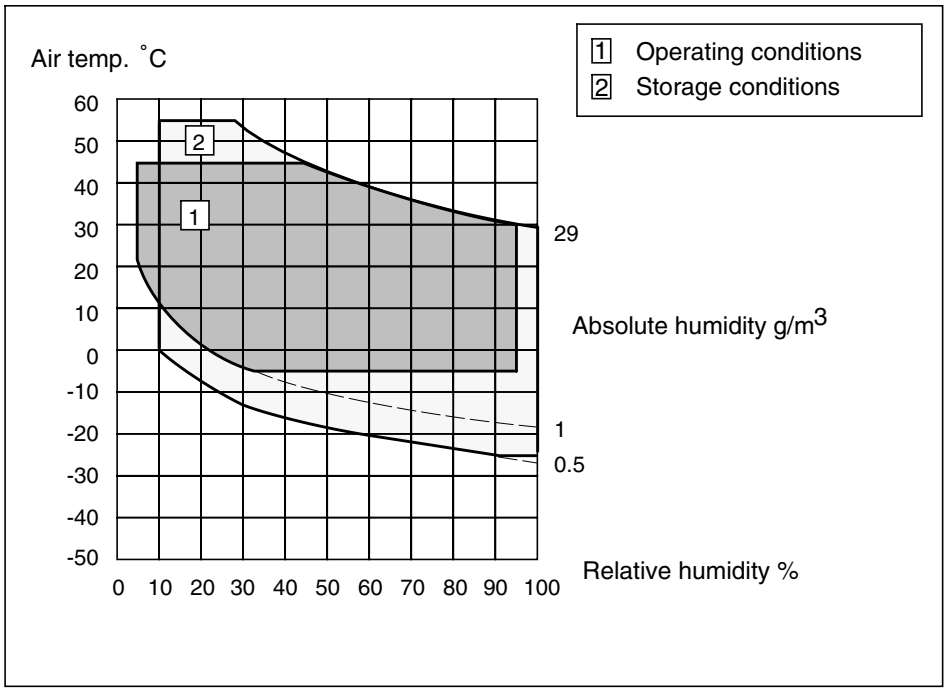


Figure 82. DNT2Mi climatogram

Table 22. Mean time between failure (MTBF)

DNT2Mi multiport	73 years
DNT2Mi single-port	134 years

10.5.2 Electromagnetic compatibility

The electromagnetic compatibility (EMC) of DNT2Mi comply with the following specifications:

Table 23. EMC requirements

EN 55022 class B (1994)
EN 55024 (1998)
EN 300386-2 (1998)

Note

The conditions listed in Section 5.1 must be fulfilled.

10.5.3 Safety and protection

Concerning protection and safety, DNT2Mi follows the requirements and specifications listed below:

Table 24. DNT2Mi safety and protection

AC power supply	Electrical safety	EN 60950
	Surge protection	4 kV common mode, 2 kV differential mode according to EN 61000-4-5
DC power supply	Dielectric strength	500 V_{RMS}
	Surge protection	1 kV according to EN 61000-4-5
Line interface	Safety	EN 60950
	Surge protection	1.5 kV according to ITU-T Rec. K.21
	50 Hz common mode test	600 V_{RMS} common mode according to ITU-T Rec. K.21

Appendix A.

A.1 Commissioning chart

You can use this appendix to mark down results of the commissioning procedure (refer to Chapter 6).

Note

We recommend that you take a copy of the charts in the following pages; do not make any markings to the original document.

Table 25. General settings

Setting	Setting
Equipment ID	
Q1 speed	
Q1 address	
Q1 management path	
Line frame format	
Timing source	
Protections	
Password	
Test timeout	
Power feed	

Table 26. Port settings

Setting	Port 1	Port 2	Port 3
Time slots			
Type			
Rate			
Timing			
Sync/Async			

Table 26. Port settings (Continued)

Setting	Port 1	Port 2	Port 3
RTS & CTS			
DCD			
DSR& DTR			
140 / RL req			
141 / LL req			
Circuit C			
Circuit I			
AIS mode			
Interface mode			
CRC-4			
Unused TS fill			
TS 0 fill			
BER alarm limit			
BER alarm sev			

Table 27. BER test results

Port 1	
Port 2	
Port 3	

Table 28. Line measurements

Noise margin	
Rx level	
Line attenuation	
Line voltage	

Table 29. Statistics

CPU reset count				
	Line	**Port 1 *)**	**Port 2 *)**	**Port 3 *)**
UAT rx				
SES rx				
ES rx				
BBE rx				
UAT tx				
ES tx				
SES tx				
*) only with G.704 adapter				

Glossary

Abbreviations

2M	2 Mbit/s
AC	Alternating Current
AIS	Alarm Indication Signal
BBE	Background Block Error
BBER	Background Block Error Ratio
BER	Bit Error Ratio
BNC	Bayonet-lock coaxial Connector
CAS	Cascade Switch
CPU	Central Processing Unit
CRC	Cyclic Redundancy Check
CTS	Clear To Send
dB	Decibel
DC	Direct Current
DCD	Line signal detector
DCE	Data Circuit-terminating Equipment
DL	Digital Loop
DNT	Data Network Terminal
DSL	Digital Subscriber Line
DSR	Data Set Ready
DTE	Data Terminal Equipment
DTR	Data Terminal Ready
EEPROM	Electrically Erasable Programmable Read-Only Memory
EMC	Electromagnetic Compatibility
EN	Euronorm, European standard

ESR	Errored Seconds Ratio
ES	Errored Second
ESD	Electrostatic Discharge
ET	Ethernet
ETS	European Telecommunication Standard
ETSI	European Telecommunication Standards Institute
GND	Ground
IF	Interface
ISO	International Organisation for Standardisation
ITU-T	International Telecommunication Union – Telecommunication Standardisation Sector (former CCITT)
LAN	Local Area Network
LAN-IC	Local Area Network Interconnection Circuit
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LL	Local Loop
LMI	Local Management Interface
MFA	Multiframe Alignment
MSTE	Macro Service Terminal Emulator
NMS	Network Management System
ONP	Open Network Provision
PABX	Private Automatic Branch Exchange
PRBS	Pseudo Random Bit Sequence
PLL	Phase-Locked Loop
PDH	Plesiochronous Digital Hierarchy
PSD	Power Spectral Density

PWR	Power
RL	Remote Loop
RLTR	Remote Loop pseudo random bit sequence 2^9-1 test
RTS	Request To Send
Rx	Receiver
RxC	Receive Clock
RxD	Received Data
SES	Severely Errored Seconds
SESR	Severely Errored Seconds Ratio
SG	Signal Ground
SHDSL	Single-Pair High-bit-rate DSL
SMB	Snap-on subminiature coaxial cable
sp/mp	single-port/multiport
STE	Service Terminal Emulator
TC-PAM	Trellis Coded Pulse Amplitude Modulation
TDM	Time Division Multiplexing
TMC	Transmission Management Computer
TR	Transmit/receive test with 2^9-1 pseudo random bit sequence
TS	Time Slot
TT	Total Time
Tx	Transmitter
TxC	Transmit Clock
TxD	Transmitted Data
UAT	Unavailable Time
UATR	Unavailable Time Ratio
VF	Voice Frequency

Terms

Data network terminal	A piece of equipment which is used for data transmission over the subscriber loop, providing access to the trunk network.
DYNANET	Nokia's family of primary rate equipment and their tributaries used in access networks. The family includes a wide range of products: primary multiplex equipment, branching and cross-connect equipment, line equipment for copper cables and optical fibres, HDSL line terminals, and integrated multiplex and line equipment.
Electromagnetic compatibility; EMC	The ability of a piece of equipment or a system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment.
Nokia NMS	Nokia's system for controlling and monitoring the resources of a telecommunications network and for recording their use and performance, in order to provide telecommunications services.
product code	A code for identifying plug-in units, programs, equipment, and other sales items.
Service Terminal	A hand-held terminal with menu-based functions, used for commissioning, maintenance and operating purposes, such as reading status and alarm data on network elements, and configuring operation modes and internal settings of the equipment.
Service Terminal Emulator; STE	An NMS application allowing the user to communicate directly with the Nokia PDH network elements.